

The Journal

OF THE

BOARD OF AGRICULTURE

NOVEMBER, 1911.

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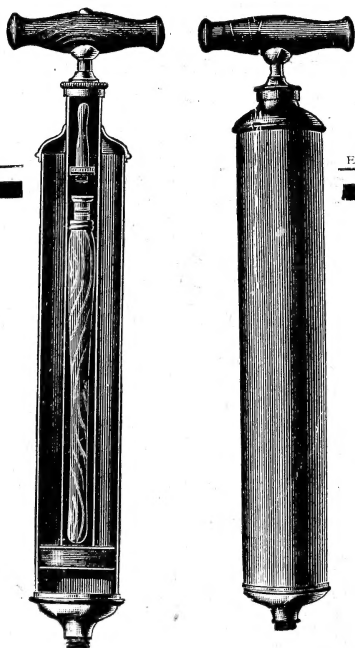
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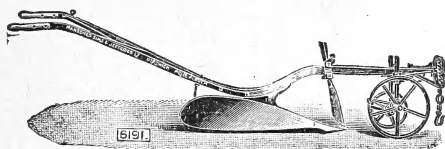
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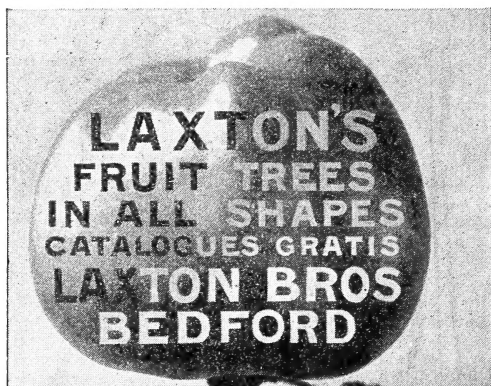
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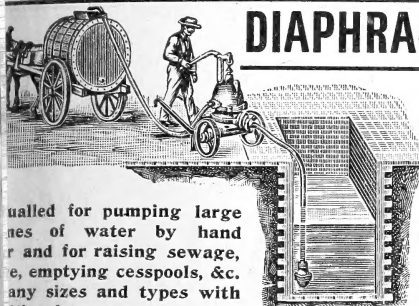
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242	Bacteriosis of the Potato and Tomato.	258	Rural Party Line Telephones.
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Two General Indexes to the Journal have been issued—a General Index to Volumes I.—X. (September, 1894, to March, 1904), price 1/- post free, and a General Index to Volumes XI.—XVII. (April, 1904, to March, 1911), price 4d. post free.

Supplements to the Journal are occasionally issued containing special reports which are too long to be inserted in the ordinary issue. These supplements are issued free to subscribers to the Journal; the price to non-subscribers is 4d. each post free. The following supplements have appeared up to the present :—

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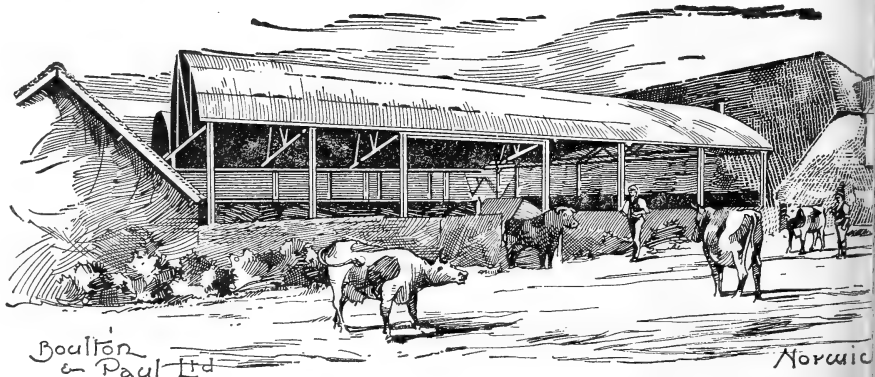
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JUN 1911

THE JOURNAL

OF THE

BOARD OF AGRICULTURE



Vol. XVIII. No. 8.

NOVEMBER, 1911.

PROVISION OF TECHNICAL ADVICE FOR FARMERS, AND THE INVESTIGATION OF LOCAL AGRICULTURAL PROBLEMS.

The Board of Agriculture and Fisheries have been informed that the Lords Commissioners of his Majesty's Treasury, on the recommendation of the Development Commissioners, have sanctioned payment from the Development Fund of a sum not exceeding £12,000 per annum to be distributed by the Board as Grants to certain Universities and Colleges in England and Wales for the purpose of assisting these Institutions to supply technical advice to farmers and to provide for the investigation of local agricultural problems.

Nature of the Technical Advice to be Supplied.

In order that the character of the work covered by this grant may be understood, it may be convenient to refer in the first place to the Memorandum on the Principles and Methods of Rural Education * issued by the Board of Education, Chapter 9, in which it is stated that :—

“This work (*i.e.*, the provision of technical information and advice for those engaged in rural industry) is of a kind that should fall partly to county staffs and partly to those of Universities and Agricultural Colleges. It is clear that advice of two kinds will be in demand in every district; in the first place, the kind of advice on the uses of manures, the relative merits of feeding stuffs, on the manufacture of dairy produce, which inexperienced persons constantly require, and which any well-prepared instructor should be

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competent to supply; and in the second place advice in more difficult matters sought, not by the inexperienced alone, but by experienced cultivators, which cannot always be supplied by ordinary instructors, because special knowledge or special investigation is necessary before advice can be given. The county staff should make a practice of referring such special problems to specialists."

The provision of special advice for agriculturists has in the past taken a somewhat minor place in the work of the Universities and Agricultural Colleges, and has usually been dependent on the inclination and qualifications of certain members of the staff. The Board are convinced, however, that there is a real necessity for work of this character, and that its provision should receive careful attention at the hands of University and College Authorities. It is to assist them in supplying the second type of advice referred to above, viz., that of a special character, that the present grant has been made.

It is not desired that the Institutions should undertake the task of replying to inquiries of a straightforward character which may properly be dealt with by the County Staff, but rather that they should devote themselves to the solution of more difficult problems which demand not merely skill and experience in agriculture, but special scientific knowledge and training.

It must be recognised that the function of Departments of Agriculture of Universities and Colleges is not merely to provide the highest grade of agricultural instruction for their students, but also to act as centres of information and investigation in the counties with which they are associated.

Arrangements are now being made for the separate expenditure of considerable sums on Institutions for the promotion of Agricultural Research,* and it will be necessary that the Universities and Agricultural Colleges should be familiar with the work done under this head in order that it may be brought to bear without delay on practical agricultural questions. In applying the results of research, many problems occur which are essentially of a local character and can only be investigated satisfactorily on the spot. The object of the

* See Memorandum on the Promotion of Agricultural Research, *Journal*, Oct., 1911, p. 545.

present Grant is to provide a means of dealing with such local problems. On the other hand, questions not peculiar to any locality can be dealt with more conveniently, and with a minimum of effort, at a Research Institution.

Cases will no doubt arise where this distinction cannot easily be drawn, and some overlapping may be unavoidable. It is, however, essential that the staffs of the institutions to be aided by the grants under consideration should utilise as far as possible the services of the Research Institutions instead of making separate inquiries into subjects which are already wholly or in part under investigation elsewhere.

Demand for Technical Assistance.

There is reason to believe that the existing demand for special assistance for the investigation of difficult local problems will very greatly increase in future.

In the first place, the Board hope that the Instructors employed by Local Authorities will to a greater degree than hitherto refer these difficult problems to institutions specially equipped for investigation, and will consult the Staffs of Universities and Colleges in regard to questions on which their scientific knowledge and experience is likely to be valuable. The Board of Education have drawn attention to this point in the Memorandum quoted above, and the practice is one which should be generally adopted.

The grants which will be distributed by the Board of Education in aid of Farm Institutes are likely to lead in many cases to an augmentation of the County Staff, and an extension in the demand for expert advice may be expected as the number of persons employed in Instruction increases.

With the increasing attention paid to agricultural education, moreover, direct applications from agriculturists for advice are likely to become more numerous. Experience in the past has shown that the more the work of a College becomes known to farmers, the more disposed they are to consult the College Staff, and if systematic arrangements for the supply of trustworthy information are made, consultations will become very common. To gain the confidence of farmers in this way it is necessary to convince them that the College Staff is able to advise not merely in regard to the general principles of cultivation and management which are within

the knowledge of skilled farmers, but as to difficulties which lie outside ordinary experience, and which may demand exhaustive investigation and patient research.

Character of the Staff.

The range of subjects on which advice may be sought is very wide, and no single institution can be expected to provide specialists in all branches, but provision should be made for the supply of expert advice in those branches of agriculture and its allied industries which are of the greatest importance in the area served by the College. For this purpose the staff should be strengthened by the addition of officers who will chiefly devote themselves to this special type of work, but there would be no objection to the utilisation of their services to some extent in teaching, provided that other members of the staff gave approximately the same amount of time to advisory work. A certain elasticity in the staff would thus be secured and a wider range of subjects covered.

In this connection it must be remembered that many inquiries on agricultural subjects, especially those likely to be made by the smaller or less experienced cultivators as regards dairying, poultry keeping, and gardening, can quite well be dealt with by the County Staff, to whom they should be referred. The object of the collegiate institutions should be to deal with the more difficult questions requiring special knowledge.

Qualifications of the Staff.

The success of the scheme depends on the selection of the right type of men. The Governing Bodies of Institutions should, therefore, be careful in recruiting their staff to secure men who have received a thorough scientific training, and who will be capable of carrying out investigations both in the laboratory and in the field. They should be familiar with the technique that may be necessary in dealing with their special branch, and be capable of closely following the latest developments in science both at home and abroad.

As explained above, it will be the duty of the consultative staff to keep in close touch with the Research Institutions, and in considering the qualifications required this factor should be borne in mind. In many cases it is to this advisory staff that the task will fall of first attempting to put into prac-

tice the results of investigations made at the Research Institutions.

On the other hand, men appointed for this work either must have, or must be prepared to acquire, a good working knowledge of one or more branches of agriculture, for in this way only can they gain the confidence of agriculturists and be able to meet them on an equal footing as regards the practical operations of the farm. With a good general experience they should soon be able to acquire a knowledge of local methods.

Conditions of Grant.

1. Grants from this fund will only be made to certain selected Institutions, not exceeding twelve in number, in England and Wales, the Governing Bodies of which will be invited to submit schemes to the Board on the general lines indicated above.

2. The grant in each case will be a grant-in-aid only. It must be used for the purpose of extending and developing special advisory work, and not for the purpose of lightening existing expenditure.

3. It will be open to any Institution to employ members of its present staff on this advisory work, but in that case their places must be filled by fresh appointments to the teaching staff.

4. The Board will require to be satisfied that the men proposed to be employed on this work possess the necessary qualifications, and that the salaries paid them are adequate in the circumstances. The men appointed should have given promise of achieving distinction in scientific work, and be such as might be expected to attain to the higher posts at Universities and University Colleges if they adopted teaching as a profession. To secure men of this type, who have also had subsequent practical experience, it will be necessary to offer adequate salaries, though the actual amount may vary according to age and experience. The Board will be prepared from time to time to consider proposals for an increase in the grant to meet such increments of salary as may become necessary owing to the appointment in the first instance of comparatively junior men.

5. The men employed on advisory work may be allowed to do a certain amount of teaching in consideration of the fact

that they may possess exceptional knowledge of certain subjects; but inasmuch as their principal duties will be to carry on the advisory and investigation work for which the grant is made, the Institution will be required to see that teaching does not absorb any undue amount of time and that equivalent assistance is given to them by other members of the staff.

6. In view of the fact that the Agricultural Departments and Colleges are intended to provide information, when necessary, for the County Agricultural Staffs, some assistance from Local Education Authorities may be anticipated, and in fixing the grants to be paid to Institutions the Board will have regard to any evidence, such as grants-in-aid promised by counties, indicating that the advisory work undertaken by the Institutions is appreciated locally.

7. Each Institution in receipt of a grant from this fund will be expected to undertake the advisory work in a group of counties. While it will not be required to investigate problems arising outside its area, it will be expected to assist, by advice, any County Instructor from another district who may apply for information.

8. Members of the Advisory Staff of an Institution in receipt of a grant will be expected to act as Correspondents of the Board for their district.

THE CULTIVATION OF ONIONS.

The most suitable soil for onions is a rich medium friable loam, though any good light soil, even of a gravelly or silty nature, will produce good crops. Clay and clay loams should be avoided where possible, though moderate crops can sometimes be obtained on land of this type. Newly broken up grass land is quite unsuitable, not only because the crop will be liable to various insect attacks, but also because this soil produces "thick-necked" onions, that is to say, plants in which the parts above ground increase heavily in bulk at the expense of the bulb. Good results have, however, been obtained on grass land in the third season after it had been broken up.

Preparation of the Land.—The land should be thoroughly freed from weeds and well stirred before any sowing is done.

The importance of thorough cultivation cannot be over-estimated, and perhaps the greatest mistake in onion growing is the neglect of this precaution.

The land should be cultivated in October or November, and left in a rough state, so that it may benefit from the action of frost during the winter. Some growers recommend a deep "two-spit" trenching, but others consider that a "one-spit" digging or ploughing of about six inches in depth is sufficient. The choice between the two methods depends largely upon the rotation practised. If onions are grown at all frequently on the same land, trenching is without doubt the better plan.

A difference of opinion also exists on the subject of manuring. Some growers apply a dressing of good half-rotten stable or cow manure, say 10 tons to the acre, while others, who are equally successful, use artificial manures only. Some of the Bedfordshire growers have been known to apply as much as 50 tons of half-rotten stable manure to the acre.

Manure should not be allowed to lie on the land for any length of time, as this encourages insects; *fresh* farmyard manure should never be used.

The advocates of the "two-spit" and cow-manure principle recommend, where the grower has *only* stiff land at his disposal, the addition of a mixture of wood and cinder ashes with basic slag or lime to the top spit, in the proportion of 7 cwt. of ashes and 10 cwt. of lime or basic slag to the acre, in addition to a good dressing of short mellow manure.

It is not uncommon for onions to follow a crop of celery. The rotation by this method would be:—(1) Early crop of potatoes or cabbage, the land being cleared in July; (2) crop of celery; (3) onions. The advantage of this method is that the extra cultivation of the land, owing to the constant "moulding up" of the celery, and the heavy manuring of the trenches, serve to bring the soil into an excellent condition to receive the onion seed. The land, as soon as the celery is off, should be dug and left until February or March. Good results are also obtained with onions following corn, cabbage, carrots, or parsnips.

Preparation for Sowing.—A dressing of 5 cwt. of super-phosphate, and from 3 to 4 cwt. of soot to the acre, is recommended. Soot is particularly valuable. Other artificial

manures recommended are salt and potash. For a light soil, weak in potash, kainit at the rate of 5 cwt. to the acre may be added with advantage.

The land should be forked and reduced to a fine tilth. The surface should be then lightly raked, and the land is ready for sowing.

Sowing and After-Cultivation.—A day should be chosen when the land is dry and workable. The seed should be sown thinly in drills about 9 in. apart and an inch in depth. The seed thus required will be from 5 to 7 lb. per acre, depending upon the variety. The seed must be raked in lightly, and the back of the rake is sometimes used for this purpose. The ground should then be rolled, and again directly the plants are up in the rows, if the weather is dry. Another dressing of soot or one of nitrate of soda is sometimes recommended at this point. Hoeing lightly is advisable to check seedling weeds and to sweeten the surface soil.

As soon as the plants are large enough to handle, they may be thinned out as required, leaving a space of from 4 to 6 inches between the plants. The labour of this operation is often reduced by *cross-hoeing*. If the plants are still too dense, thinning out by hand should be resorted to, though this is rare in good cultivation for market purposes.

The hoe should be kept constantly in use, to prevent the growth of weeds. In a damp season, when the tops appear to be making too much growth, it is advisable to bend them over with the hoe handle or something similar. Towards the middle of August it is advisable to determine, by pulling up a few bulbs, whether the crop is ready for gathering. If such be the case, the roots will be noticed to have withered. This prevents the possibility of what is known as second growth, namely, that of the new bud, lying between the swollen leaf bases of the bulb.

Gathering and Storage.—Having determined, in the way mentioned above, when the crop is ready, the gathering should be done on the first fine dry day. A few rows are pulled, and the bulbs allowed to lie. Then the few rows on either side of these are pulled, and the bulbs from the outside rows placed with those lying in the centre, so that one gets alternate alleys of drying onions and of bare land.

During the drying, should the weather be showery, the bulbs should be constantly stirred, to prevent second growth and the formation of fresh roots. When the bulbs are perfectly dry, they should be collected and stored either on the barn floor, or on specially constructed drying shelves. These shelves are placed along the length of the barn—one above the other, as in a book case—and are constructed of 3 in. laths placed lengthways about 1 in. or $1\frac{1}{2}$ in. apart, to allow the air to penetrate freely. The bulbs should be moved about once a week, to avoid "sweating," or dampness of the crop.

Growing for Exhibition.—When growing for exhibition purposes, seed pans or shallow boxes, filled with a light loam compost, should be prepared and placed in a frame or in a cold greenhouse to be protected from winter frosts. The seed should be sown thinly in December or January, and liberally, though not excessively, watered. As soon as the seedlings are large enough to handle, they should be pricked out singly into small pots and replaced in the frame.

When the weather is suitable, as soon as possible after the middle of March, they should be permanently planted out, in a sunny position sheltered from the cold winds, in rows 9 in. to 12 in. apart, the distance between plant and plant in the row being also 9 in. to 12 in. A liberal supply of liquid manure (a *weak* solution of sheep or cow manure with soot in suspension) should be applied once a week. The greatest care should be taken in handling the bulbs, as the forcing causes the skin to be very tender, and the slightest bruise will cause their early decay.

Growing Pickling Onions.—There are several differences in cultivation when onions are grown for pickling. In this case, the soil is prepared in exactly the same way, but the drills are 7 in. apart, and a much larger quantity of seed is used; no thinning of the young seedlings is required. Thus the density of the crop and the struggle for existence prevent the bulbs from attaining any but a pickling size. As a rule, however, large onion growers grade out the small bulbs for pickling purposes rather than make a special cultivation.

In preparing for pickling, the small onions should be steeped in boiling water for a short time, then drained and allowed to cool. This makes peeling much easier. The

onions should then be steeped in a strong solution of common salt for about a day, then carefully drained, and allowed to dry thoroughly. Finally, they should be put in bottles containing vinegar, which has been well spiced with cloves, peppercorns, coriander, ginger, &c.

Production of Pickling Onions in Holland.—The growing of pickling onions on a large scale suffers rather severely from competition from Holland, and owing to various representations made to the Board of Agriculture as to the serious effects of composition from this source, investigations * were undertaken by the Board in the year 1902, which showed that the social and economic conditions under which the industry was conducted in the Netherlands differed in many respects from those existing in this country.

These differences, however, were not sufficient at that time to enable the brining factories to place their goods on our markets at prices persistently lower than those at which English goods have been quoted, and, in fact, the evidence collected by the Board, both in the Netherlands and in this country, went to show that the prices paid by pickling firms for first quality Dutch silverskins in brine delivered in London were, in some seasons, higher even than those quoted for home produce. The secret of the success of the Dutch competition was considered to lie mainly in the fact that the onions exported from the Netherlands presented, on the whole, a better appearance, and met more readily the requirements of the pickling firms, because more effective methods and greater care were employed in their preparation for brining. These methods are described in the report, and an account is given of onion cultivation in Holland.

Onion Pests.—The two principal pests of the onion, viz., onion fly and onion mildew, are dealt with in the Board's leaflets, Nos. 31 and 178.

Varieties of Onions Recommended.—(a) For Market Purposes: White Spanish, Bedfordshire Champion, Giant Zittau, Nuneham Park, Rousham Park Hero. (b) For Exhibition Purposes: Ailsa Craig, Southampton Champion, Golden Globe. (c) For Pickling Purposes: Silverskin, Queen Pickling.

* Report on the Dutch Brined Vegetable Industry. (Cd. 1368, 1902. Price 8d.)

PREPARATION OF WOOL FOR MARKET.

J. W. COLLINSON.

IN view of the great competition in the trade in wool and the excellence of the conditions under which the colonial produce is placed on the market, it is more than ever important that flockmasters should pay careful attention to the cleanliness of the fleeces in order that the wool may not suffer depreciation in price owing to careless preparation. Among the points to be borne in mind are the following:—

Winter Feeding.—When rack-feeding of hay or clover begins in the winter, great care should be taken that the sheep can obtain the food without its getting into the wool on their necks or backs, as it is practically impossible to remove seeds and fine fibres afterwards.

Washing and Shearing.—Every sheep ought to be thoroughly “clagged” or “burled” before it is washed. Under whatever conditions the sheep are washed, it is essential that they should have a good “swim,” the wool being lifted by hand or by “poying poles” made for the purpose, and which are now in use in some districts. A large amount of grease and dirt is got rid of in this way. Where there is a choice of water, the softest should always be used.

After washing, the sheep should be got on to grass land as soon as possible. Driving along a road should be avoided wherever practicable. Fields with bare patches of soil or roadways ought to be avoided until after the sheep are shorn. Not more than seven to ten days should be allowed to elapse between washing and shearing, as the natural grease in the animal soon begins to rise, and then the wool quickly becomes very little better than “unwashed.”

On no account should the sheep be clipped when the wool is not thoroughly dry. The underneath portions are most likely to be damp, especially in long-woolled sheep, and when the wool is wound, this part being inside the fleece, and hence excluded from the air, soon begins to “heat” and rot.

Sheep, if housed prior to shearing, should be “bedded” with bean or wheat straw in preference to that of oats or barley.

The shearing should be done on a clean floor, or on a stack-cloth if in the open air. The practice of mowing the

grass where sheep are to be shorn, even if it is carefully swept before the shearing, is most undesirable. It is impossible to remove all the pieces of grass, and these get into the fleece, and, being almost like threads, cannot be removed, and cause much labour and loss in the future processes through which the wool has to pass. All earth-lumps or dung should be removed before the wool is "wound."

Locks, tailings, skin-wool, blacks, cotts, or greasy wool must be kept separate and never put inside the fleeces. To do otherwise constitutes "false-winding."

Branding of Sheep.—The use of tar or paint is very objectionable for branding, and such substances should be used as sparingly as possible, and if the brand is not placed on the ear or face, then it should be put immediately above the tail of the animal. In many cases much too large a branding-iron is in use. There is some reason to hope that before long a material that will stand as a "mark," and yet be soluble in hot water, will be discovered. If such a material were obtainable and were universally used, the loss which manufacturers suffer under present conditions would be avoided.

Methods of Tying Fleeces.—The fleece should be "wound" on a clean wooden table, and should be tied with a "band" made by twisting a portion of the fleece itself. Most farmers tie up their fleeces in this way, but in a few western and southern counties string or binder-twine is used for the purpose. This is most objectionable, especially in the case of "binder-twine," which is loosely made, and consequently "frays" and gets into the wool. The loss entailed by this practice in the after-processes is very serious, as the most careful supervision fails to find the small particles, which get into the cloth, causing endless annoyance and trouble.

Storage of Wool.—The wool should be stored in a dry chamber or granary, and be piled clear of all the walls and carefully covered in order to keep out the dust.

Rats and mice should be kept from it if possible, as where they have access they carry corn and other materials into it, and in other ways injure the wool.

Dips.—In the selection of dips, care should be taken to use only those that do not permanently stain the wool or injure the fibre.

FARMING IN SPAIN.

E. T. BROWN.

THE traveller who is familiar with Northern or Central Spain regards the country as comparatively poor from an agricultural point of view, chiefly consisting of mountains and large tracts of almost valueless soil; whereas he who knows the South, the fertile and luxuriant Andalusia, particularly the district in the neighbourhood of Malaga, where olives, lemons, oranges, and the sugar cane abound, naturally looks upon Spain as perhaps the most favoured agricultural spot in all the world, a country that is, in truth, flowing with milk and honey. In a few respects the Spanish farmer takes advantages of his opportunities; in a great many respects, however, he fails to do so. In the Basque and Asturian Provinces the methods employed are the same as those introduced by the Celts and Cantabrians; in Catalonia and the Provinces bordering on the Mediterranean there is little or no improvement upon the methods practised by the Greeks and Carthaginians, the latter of whom dominated Spain during the years 238 to 200 B.C. The cultivation of the olive and vine is identically similar to that described in the Old Testament, while the plough and the other rude agricultural implements in use are the same as those to be seen on the monuments of Egypt and Asia Minor.

Before all else Spain is an agricultural country. Possessing as it does in many districts a light and easily cultivated soil, a favourable combination of intense heat and a sufficient supply of moisture, and an entire absence of late frosts, agriculture naturally flourishes, besides which the Spaniard has always preferred farming to trade. Until within comparatively recent years Spain has been constantly at war, and this, coupled with the fact that roads are few and at times well-nigh impassable, has prevented the steady development of trade. Trade, moreover, has always been regarded by the Spaniard as unworthy his attention, while farming, on the other hand, has ever been considered a gentleman's pursuit. Intensive rather than extensive farming is the rule, and since Spain is a thinly populated country there are

enormous tracts of lands which are almost uninhabited, which could support ten times their present population. This intensive farming is again largely due to the fact that Spaniards have always been a fighting nation, and "even when permanent conquests fixed them anywhere their farm-houses became castles, their meadows fields of battle, and their ploughmen and drovers fighting men. Thus a peasantry, all guerillos to the bone, living amid perpetual border warfare, exposed to the raids of the Christians, and the talas of the Moors, was not likely to possess artificial pasture and forests."

During the last few years there have been several indications of improved methods of farming in Spain, and the Government is helping to some extent. Spain has no Ministry devoted exclusively to agricultural affairs, which are managed by the "Direccion general de Agricultura, Minas y Montes," a department of the "Ministerio de Fomento." Several Government Schools have been started, while model farms have been established, among other places, at Vittoria, Barcelona, and Aranjuez. Agricultural shows are now held annually in many of the principal cities of Spain, while a few farmers' clubs have been inaugurated. So far little has been done in the direction of co-operation, though probably this would do more for the Spanish farmer and small-holder than anything else. In many districts the land is mostly occupied by small farmers, the average size of whose holdings is about seven acres. There are, it is true, many extensive farms, but these are generally worked by the owner, large tenant farmers being extremely uncommon. The Duke of Wellington owns an enormous estate near the town of Granada, and this is in every way a model establishment.

In Northern Spain, where there is comparatively little sun, and where the soil is not particularly fertile, the chief work of the farmer is the cultivation of maize and fruit, and the raising of cattle. Very little corn is grown, and although there is a considerable area devoted to the vine, the grapes are of poor value, producing an inferior and rather bitter wine. There are, of course, some exceptions to this rule, notably in parts of Aragon and Catalonia, where some excellent wine is produced. In the Basque Provinces and

Galicia, maize is cultivated to a very large extent, where it forms the staple diet of the working people. The maize is sown about May; weeding takes place but once, generally during July, and the grain is harvested in September. Only in the Basque Provinces and in the West are there any hedges, the absence of which renders the countryside harsh and uninteresting. Forests are fairly plentiful, and many of the hills are thickly covered; fruit trees—principally apple and pear—are abundant; a large quantity of very good cider is produced. The cattle in the North are small, with short horns; few horses are to be seen, most of the draught work being done by cows, which naturally do not yield a very generous supply of milk.

The West of Spain consists mostly of grazing land, and according to the official figures there are under sixty inhabitants per square league. Farming in this part of Spain is purely pastoral. The *Concejo de la Mesta*—a company of sheep proprietors—was established in 1556, and was granted very arbitrary privileges. Towards the end of the sixteenth century this company possessed over 7,000,000 sheep, while to-day it has about 5,000,000. During the summer months the sheep live in the mountains, but they are brought down to the warmer valleys about October, where they remain until March. The sheep are divided into what are termed *Cabanas*, or huge flocks of about 10,000 head, each being directed by a *Mayoral* or *Merino*, who has fifty shepherds under his command. The breed of sheep in Western Spain is called the *Merino*, after the name of the chief shepherd, and they are now famous the world over for their wool.

The central region of Spain consists of vast treeless plains, interspersed with rocky and barren mountains. Some of the land is excellent, but some consists of almost pure sand, and does not pay to cultivate. This region is the granary of Spain, where corn growing—wheat and barley—is the chief occupation of the farmer. The corn is sown broadcast on fallow land, and ploughed in, generally in October or November; in the spring, weeding takes place, and in July the grain is ready for harvesting. Cutting with the sickle and not with the scythe is invariably adopted. In many parts the grain is thrashed in the Biblical fashion by means

of treading with mules or oxen. Practically no manuring is done, and in many cases the system of cropping is "every alternate year," *i.e.*, the soil lies fallow for one season and produces a crop the next. The form of plough in common use is simple in the extreme. It consists of an elm tree, stripped of all its branches save a lower one, which is sharpened and covered with a piece of thin iron; the trunk of the tree is the pole, to which the oxen are attached. Its cost varies from 10s. to 15s., and it weighs about 22 to 24 lb.

The Southern and Eastern districts of Spain are probably the most fertile in the world, and this is indeed the farmer's Eden. For the most part the farms are fairly extensive, and are generally worked by the proprietor, though there are a few places where the land is divided up into innumerable small holdings. Olive groves, vineyards, orange and lemon orchards, abound everywhere; the sugar cane flourishes in the neighbourhood of Malaga; rice and raisins thrive well and prove profitable crops, while large areas of land are suitable for cotton growing. In the eighteenth century there were produced in the province of Granada in one season upwards of 300,000 lb. of cotton, while earlier still the Arabs successfully cultivated the plant on the Andalusian shores. Its cultivation has for some reason been abandoned, but there is a movement on foot for its re-introduction.

Government Action for the Promotion of Agriculture.—The following information as to the action of the Spanish Government with regard to agriculture during the year 1910 is given in a recent Foreign Office Report (Annual Series, No. 4,749):—

The past year has witnessed great activity on the part of the Ministry of Fomento on behalf of agriculture. Two Bills of importance were presented to the Cortes during the year. The first provides for the creation of a "National Institute of Agricultural Credit." The institute is to exercise functions of inspection and control over agricultural credit and insurance companies, co-operative societies, irrigation syndicates, &c., established by private enterprise. It is also to establish banks authorised to advance money to farmers for purely agricultural purposes on mortgage at a rate of interest not exceeding 4 per cent. The second Bill prescribes measures

to be adopted for the suppression of agricultural pests. It provides that, in every municipal district, there shall be established a committee charged with the inspection of agricultural and forest lands with a view to the discovery, prevention and suppression of pests. All classes of persons employed in agricultural pursuits are to be obliged, under pain of a fine of 50 pesetas (37s.) to report to the committee any cases of pests which may come under their observation. All agriculturists are obliged to adopt such measures as may be prescribed by the committee and sanctioned by the Government inspectors. A scale of fines is laid down for non-compliance and of compensation for damage suffered by individuals through measures of isolation, &c. Steps are to be taken to spread a knowledge of pests and of the methods of dealing with them. The scheme is to be financed by the formation in each district of a fund which may not exceed 5 per cent. of the capital sum at which the district is assessed for taxation under the heading of "Agricultural wealth."

A large number of Royal Orders, dealing with almost every aspect of agricultural life, were also published during the year. One of the most important obliges sellers of natural and chemical manures and fertilisers to guarantee their composition, and grants to buyers the right of having their purchases analysed at the Government agricultural laboratories. Other Royal Orders have for their object the stamping out of locusts, with which several Spanish provinces are now infested.

Agriculture is, like all other branches of national activity, to benefit by the scheme for the economic reconstruction of Spain. In addition to that part of the project which refers to irrigation, agriculture is to receive direct advantages in the form of a grant of 2,000,000 pesetas (£74,000), to be spent on supplying the existing agricultural schools and experimental stations with modern necessities. Additional establishments of this sort are to be provided for those provinces which do not already possess them, and a school for the training of agricultural engineers is to be founded.

THE Board have recently made arrangements for the continuation of the experiments on the laying down of land to grass which have been carried on for

**The Elliot System
of Farming.**

many years by Mr. R. H. Elliot at Clifton-on-Bowmont, near Kelso.* As the farm on which they were conducted has recently been let to a tenant, there was some danger that the experiments would be brought to a conclusion, but in consideration of a small annual grant the tenant has agreed to continue the essential features of Mr. Elliot's system of farming, and to allow agriculturists to visit and inspect the farm.

Clifton-on-Bowmont is situated at the foot of one of the spurs of the Cheviot Hills, a portion of the farm running up to an elevation of 500 feet, or thereabouts. The soil is poor, very stony, and liable to deteriorate unless skilfully managed. Owing to its dryness it suffers severely from drought. Since in these circumstances there is great difficulty in getting a tenant, in 1887 Mr. R. H. Elliot took the farm under direct management, and resolved to carry out a series of experiments in order to determine the most suitable system of farming to be followed. The first and obvious requirement was to obtain a drought-resisting herbage. After many trials Mr. Elliot eventually devised a mixture which he claims possesses special advantages for the soil and climate of the farm.

This mixture differs from ordinary seed mixtures in that perennial Rye-grass is replaced by Cocksfoot, while it contains the seeds of a number of drought-resisting plants, such as Yarrow, Kidney Vetch, Chicory, and Burnet, not ordinarily found in grass mixtures. The composition of the mixture is not always the same, but the following may be taken as typical:—Cocksfoot 14 lb., Tall Fescue 7 lb., Tall Oatgrass 7 lb., Rough-stalked Meadow-grass 1 lb., late flowering Red Clover 2 lb., White Clover 2 lb., Alsike 1 lb., Burnet 8 lb., Kidney Vetch 3 lb., Chicory 3 lb., Yarrow 1 lb., at a cost (in 1900) of £1 19s. 5d., or (in 1911) of about £3 per acre. Mr. Elliot is of opinion that the benefits resulting from the use of these plants are due to their deep-rooting habit; he also

* An article by Mr. R. H. Elliot on this subject appeared in the *Journal*, Vol. VIII, Dec., 1901, and an account of experiments on similar lines at Abbotsley was published in the issue for Nov., 1905, Vol. XII.

advocates a change in the ordinary rotation of the locality, which is a five-year shift (*viz.*, turnips, oats, seeds, seeds, oats), and claims that better results are obtained by leaving the seeds down for four or five years, to be followed by two successive crops of turnips and oats; that is to say, while under the local system one-fifth of the area is under roots and two-fifths under cereals, Mr. Elliot's system gives one quarter under roots and one quarter under cereals. He claims that under his system the only manure required is a moderate dressing of artificials with the roots, and that the local system leads to an excessive handling of farmyard manure and an impoverishment of the soil as well.

On the farm at Clifton the visitor can see Mr. Elliot's mixture at all stages of growth, and can compare it with the pastures obtained by the ordinary methods practised in the neighbourhood. There can be no doubt that in the earlier years Mr. Elliot's mixtures on certain soils produce a better growth of herbage than the ordinary commercial mixtures, but the former cost more, and further investigation is necessary to determine whether the results justify the additional expense.

An inspection of the farm was recently made by Dr. J. Augustus Voelcker, who has been good enough to furnish the Board with the following observations:—

"We went over a number of the fields, inspecting in particular those that were down in grass. The chief interest in these lies in the fact that here one can see fields laid down in grass according to Mr. Elliot's system, and which have been in grass for one, two, three and more years, and some even longer. Further, there were opportunities of seeing the difference between the portion of a field that had been hayed and the portion that was fed by sheep and lambs.

"Despite the dry season the first year's grass was very vigorous and green. Where a hay crop had been taken, the hay was largely composed of clover, together with kidney vetch and chicory, the cocksfoot not being prominent. In the second year's growth, after haying the first year, the cocksfoot grows strongly and forms a considerable bulk of the pasture.

"In different fields we were able to see the result of using

cocksfoot in varying quantities at the time of seeding, the practice being to employ a heavier seeding where the fields are more distant and are intended to lie down longer in grass, while a lighter seeding of cocksfoot is used for those that are to be only three or four years in grass.

"On the 'in' fields (those of better nature and nearer the homestead) a five or six years' course is followed, generally 1. Oats. 2. Roots. 3. Barley or Oats. 4. Grass for two to three years, then the grass ploughed up.

"On the 'out' fields (those more distant and less able to carry corn crops) the usual practice is to put into turnips (out of grass) then take oats, next turnips again, and then lay down to grass in a corn crop, and leave the grass down for some years. We saw instances of both of these plans. Both root and corn crops were decidedly good.

"Particularly interesting was 'Bank Field,' the soil of which has been examined chemically each year since the field was laid down to grass, in 1900, with Mr. Elliot's mixture. It remained in grass from 1900 to 1909, when it was ploughed up and put in roots (1910). The barley crop of this present year (1911) was an excellent one, and the grass seeding in the barley showed quite a good plant as well.

"In 'Little Countryside' field, turnips taken out of grass were a good level crop, and will be followed by oats. The same applies to the adjoining field 'Harewells.'

"On the 'Island' field, sown down to grass in 1910, there was a luxuriant 'take' of grass and, though the area was only $3\frac{1}{2}$ acres, it had kept this season 25 half-bred tups.

"A field of 14 acres, called 'Chapel Croft,' had been laid down in 1909 in an oat crop. In 1910 a good hay crop was taken, and now (1911) it was being fed with sheep, and was carrying three ewes with twin lambs to the acre.

"A fine crop of oats was to be seen in 'Little Haugh,' this being the first crop after the ploughing up of the grass.

"'Front Field'—laid down to grass in 1906—was still quite good, and the present tenant intends leaving it down longer.

"In 'Big Haugh'—laid down in 1904 and still in grass—an experiment had been made in applying farmyard manure to the field—one-half being dunged in 1910 and the other half in the present year. In this same field was, at one corner, a

portion where the original seeding of 1893 (also Mr. Elliot's) remained, and had not been ploughed up (in 1904) with the rest of the field. This portion was decidedly the best in the whole field. The crops, whether arable or grass, were excellent all round, and afforded opportunities of judging alike what pasture laid down on the Clifton system looked like at different ages, and also of what the corn and root crops taken after the ploughing up of the pasture were."

IN an article entitled "The Soil and the Plant," which appears in the current issue of *Science Progress*, Dr. E. J.

**Theories of
Plant Nutrition.** Russell, of Rothamsted, discusses some recent American hypotheses on plant nutrition. According to the

generally accepted view, manures benefit plants by directly supplying nutritive materials. For example, when phosphates are added to the soil, it is believed that they go to supply the phosphorus required by the growing plant. Of recent years, however, a different view has obtained some vogue. It originated in America, and has been adopted by the Bureau of Soils of the United States Department of Agriculture.

The new hypothesis is based on the assertion that the "concentration" of the soil moisture is always constant, whatever the manurial treatment may have been; in other words, it is asserted that the amounts of nutritive salts in solution in the soil water remain constant. If this is true it follows that the chemical constitution of the soil is without effect on plant growth; fertility must depend upon the physical factors regulating the supply of soil solution to the plant; for if the soil solution is always the same, plants can obtain more nutritive substances only by obtaining a greater volume of the solution. To complete the hypothesis, it is asserted that infertility is often due to the presence in the soil of toxic substances, some of which have undoubtedly been isolated. The old hypothesis of de Candolle is thus revived, and the toxicity is believed to be due to the presence of substances excreted by plants in the normal processes of growth, such substances being harmful to other plants of the same genus, but not necessarily harmful to plants of a different kind.

A convenient explanation is thus provided for the beneficial action of rotation of crops and the sterility which results when the same crop is grown continuously on the same ground. In order to explain the unquestioned beneficial effects of fertilisers, which the above hypothesis would seem to negative, it is supposed that they act either on the distribution of the soil moisture, or as antidotes to the toxic substances.

In discussing this hypothesis Dr. Russell in the first instance points out that the evidence is insufficient to establish the primary assumption that the soil solution is constant for all soils. Figures are quoted to show that the concentration, while showing little absolute variation, yet relatively differs considerably. The difference between 5 parts per million and 30 parts per million, when stated in concrete figures, is small, but relatively it is equivalent to a difference of 500 per cent. Moreover, the irregular distribution of the figures, showing the number of results for each degree of concentration, suggests that the variation is outside the ordinary experimental error.

In the next place, Dr. Russell contests the view that variations in the soil concentration do not influence the rate of plant growth, and consequently are without influence on fertility. He points out that, while there is always a limiting factor which controls the situation, the amount of growth in nutrient solutions tends to increase as the concentration of salts is increased.

With regard to toxic substances, it is pointed out that it is not surprising that some of the numerous organic compounds in the soil should have a toxic action when supplied to the plant through the medium of a water culture. It does not follow that such substances retain their toxic properties when added to the soil. In regard to the phenomena associated with "sour" soils, the writer is, however, prepared to admit that toxic substances may be present.

In regard to the excretion of toxic substances during the normal processes of growth, Dr. Russell is able to bring forward the results of his own work at Rothamsted, and to show that there is no evidence in support of this hypothesis. Plants grown continuously in water, sand and soil cultures for as many as six generations, have shown no signs of

suffering from toxicity. Again, wheat has been grown continuously in the Broadbalk field at Rothamsted for sixty years, but so far there is no sign that the plot is suffering from the presence of any toxic substance.

It must be admitted that the investigations of the Bureau of Soils have served a useful purpose in directing attention to factors of fertility other than the chemical composition of the soil. Physical conditions undoubtedly play a more important part than the earlier chemists were disposed to assign to them, but investigation on fertility cannot be restricted to chemical and physical conditions: the biological changes which go on in the soil must be investigated, and these again cannot be restricted, as they have been hitherto, to the bacterial flora. As Dr. Russell's work on soil sterilisation demonstrates, higher forms of life are probably at work, and may exercise a profound influence on plant growth.

AN estimate of the cost of producing cereals in the United States in 1909 has been made by the Bureau of Statistics of the United States Department of Agriculture. The estimate is based on the replies received from about 5,000 correspondents of the Bureau of Statistics, who were asked to supply information on the following points:—Cost per acre of (1) commercial fertilisers, (2) preparing ground for seed, (3) seed, (4) planting, (5) gathering or harvesting, (6) preparing for market, (7) wear and tear on implements, (8) rent of land or interest on its value, (9) other items of cost, (10) total cost, (11) average yield of product per acre, (12) value per bushel, (13) value of crop per acre (not including bye-products), (14) value of bye-products, (15) average size of fields in acres, (16) average value per acre of land growing the crop.

The cost of the labour, both manual and of animals, whether owned or hired, was estimated upon the basis of the prevailing rate of wages paid, whether the actual work were done by the owner or hired labour. The cost of preparing

ground for seed included the cost of applying manure where this was done; and the cost of cultivation included all costs from the time the crop was planted until ready for harvesting. With the cost of preparing for market was included all expenses between harvesting and marketing. The information received by the Bureau from its correspondents referred either to their own farms or to typical farms in their vicinity.

As a result of this inquiry the following estimates have been obtained (a dollar has been reckoned at 4*s.* 2*d.*):—

	Wheat.	Oats.	Maize.
	<i>s.</i> <i>d.</i>	<i>s.</i> <i>d.</i>	<i>s.</i> <i>d.</i>
Cost per acre, excluding rent...	32 8	29 8	35 6
" " including rent...	46 6	45 6	51 1
Value of grain, per bushel...	4 0	1 8	2 7
" " per acre...	68 8	58 8	83 8
Cost per bushel, excluding rent...	2 0	0 10	1 1
" " including rent...	2 9	1 4	1 7
Value of grain, less cost (<i>i.e.</i> profit) per acre excluding rent...	36 5	29 0	48 2
Value of grain, less cost (<i>i.e.</i> profit) per acre, including rent...	22 8	13 2	32 7
Value of grain, less cost (<i>i.e.</i> profit) per bushel, excluding rent...	2 1	0 10	1 6
Value of grain, less cost (<i>i.e.</i> profit) per bushel, including rent...	1 4	0 5	1 0
	Per cent.	Per cent.	Per cent.
Excess of value over cost (<i>i.e.</i> profit) excluding rent	116	97	136
" " " " including rent	50	29	64
	Acres.	Acres.	Acres.
Average size of fields...	59·6	25·5	30·2
	<i>s.</i> <i>d.</i>	<i>s.</i> <i>d.</i>	<i>s.</i> <i>d.</i>
Value per acre of land...	227 6	293 8	247 8
	Per cent.	Per cent.	Per cent.
Percentage of rental to land value ..	6·3	5·4	6·3

Cost of Producing Wheat.—The cost of producing wheat is thus £2 6*s.* 6*d.* per acre, or 2*s.* 9*d.* per bushel. The cost per acre is made up of the following items (all per acre):—Artificial manures, 2*s.* 5*d.*; preparation of land, 8*s.* 10*d.*; seed, 5*s.* 11*d.*; planting, 1*s.* 11*d.*; harvesting, 5*s.* 6*d.*; preparing for market, 6*s.* 2*d.*; miscellaneous, 1*s.* 11*d.*; rent, 13*s.* 10*d.* The cost of production of wheat per acre varies from £4 18*s.* 8*d.* in Maine to £1 17*s.* 5*d.* in South Dakota; the chief reasons for the difference being the higher rent and cost of fertilisers in the former State; the cost of production per bushel is again greatest in the case of Maine, with an equally large cost in South Carolina, while a bushel of wheat is produced with least expense in Montana.

Yield of Wheat.—The yield of wheat varies from 36·2

bushels per acre in Vermont to 12'8 bushels per acre in South Carolina, the average for the United States being 17'2 bushels. An indication of the quality of the grain (4s. per bushel for the whole Union) is given by the value per bushel in the various States; this is greatest in the case of South Carolina and Georgia, and least in the case of Utah and Idaho. The average value of the grain per acre over the whole of the United States is estimated at £3 8s. 8d.

Profit from Wheat Growing.—Taking the country as a whole, the net profit from wheat growing works out at £1 2s. 8d. for every acre under the crop, or at 1s. 4d. for every bushel of grain produced. The remarkable estimate of a profit of £4 2s. 6d. per acre was made for Vermont, while the cultivation of wheat would also appear to be a very profitable matter in the far western States of Montana, Wyoming, Colorado, and New Mexico. The profit is only about 10s. per acre in West Virginia, Kentucky, and Tennessee.

Cost of Producing Oats.—It will be seen that the average cost of producing oats in the United States is £2 5s. 6d. per acre, or 1s. 4d. per bushel. The various items which go to make up this cost are as follows (all per acre):—Artificial manures, 1s. 8d.; preparation of land, 7s. 10d.; seed, 4s. 8d.; planting, 1s. 10d.; harvesting, 5s. 7d.; preparing for market, 6s. 4d.; miscellaneous, 1s. 10d.; and rent, 15s. 9d. The highest cost per acre as regards individual states is in Maine and Maryland with 86s. and 94s. per acre respectively, while the cost is lowest in Missouri and North and South Dakota, the expenses in each of these States not exceeding about 36s. per acre. The cost of producing a bushel of oats is highest in Connecticut and Maine (2s. 3d.) and Arizona (3s. 3d.), and lowest in North and South Dakota, Minnesota, Iowa, and Missouri (1s. 2d.). The average cost for the whole country is 1s. 4d. per bushel.

Yield of Oats.—The yield varies from 59'2 bushels per acre in Utah and 51 bushels per acre in Montana to 22 bushels in Arizona and Florida, the average for the United States being 35'2 bushels. The grain is priced highest in Arizona (3s. 9d. per bushel), and lowest in Iowa, North and South Dakota, and Nebraska (1s. 5d. per bushel); the average is

1s. 8d. The average value of the grain per acre over the whole of the United States is estimated at £2 18s. 8d.

Profit from Growing Oats.—The above table shows that the profit from growing oats is 13s. 2d. from every acre under the crop, or 5d. for every bushel produced, these figures comparing very unfavourably with the corresponding figures for wheat. Large profits would seem to be obtained in several instances, however, notably in New Hampshire (47s. 2d. per acre), California (48s. 9d. per acre), and New Mexico (51s. 5d. per acre); in fact, the profit in the ten far western States is three times as great as the average for the whole country.

Cost of Producing Maize.—The cost of producing maize is £2 11s. 1d. per acre, or 1s. 7d. per bushel. The cost per acre is made up of the following items (all per acre):—Artificial manures, 3s. 5d.; preparation of land, 8s. 10d.; seed, 1s. 0d.; planting, 1s. 10d.; cultivation, 9s. 4d.; harvesting, 9s. 2d.; miscellaneous, 1s. 11d.; rent, 15s. 7d. The cost per bushel, as well as the cost per acre, is highest in the New England States. In Maine the cost of production per acre is £7 14s. 5d., and per bushel 3s. 0d.; while in Oklahoma the cost per acre is £1 15s. 9d., and the cost per bushel 1s. 6d.

Yield of Maize.—The yield per acre is greatest in the New England States (New Hampshire 53·7 bushels), and least in the States of Florida and Mississippi (19 bushels); the average for the whole country is 32·4 bushels per acre. A bushel of grain is priced highest in Georgia and Florida (3s. 9d.) and South Carolina (4s.), and lowest in Minnesota, Iowa, South Dakota, and Nebraska (2s. 1d.). The average value per bushel over the whole of the United States is 2s. 7d. The average value of the grain per acre is estimated at £4 3s. 8d.

Profit from Maize Growing.—The greatest profit per acre from maize growing is obtained in Rhode Island and California (£2 19s. 6d.); as low a profit as 11s. 2d. per acre is made in Mississippi, while for the whole of the United States the profit averages £1 12s. 7d. per acre.

COMPARATIVELY little is at present known with regard to the biological factors which cause improved egg production, or as to the laws according to which these factors operate. Empirical methods have led to a knowledge of how to feed, care for, and, to some extent, breed fowls with a view to a high egg production; but the biological laws underlying the process of egg production are still but little understood. A valuable contribution* to the subject has recently been made by Dr. Raymond Pearl and Dr. F. M. Surface, based on an analysis of certain comprehensive statistics relating to egg production in certain breeds of the domestic fowl which are available as the result of many years' work at the Maine Agricultural Experiment Station. Exact records of production have been kept at this station since 1898 by the use of the trap nest, and from 1905 onwards the work has been conducted with the co-operation of the Bureau of Animal Industry of the United States Department of Agriculture.

Material and Methods of Investigation.—The statistical material dealt with in the investigation is furnished by the egg records of two breeds of hens—Barred Plymouth Rocks and White Wyandottes. All the birds used at the beginning of the breeding experiment in 1898 were pure-bred, and had for some years been bred under the direction of the late Prof. G. M. Gowell. The hens used for breeding from 1898 onwards have been only those birds which have, between November 1st of the year in which they were hatched and November 1st of the following year, laid 160 or more eggs; and the male birds used since 1900 have been only those from hens which have laid 200 or more eggs in such a year. With the exception of the first years there has been no close in-breeding; no birds as closely related as first cousins are said to have been bred together since the first year of the breeding experiments.

Throughout the inquiry the "first year's egg production" of a hen has been taken as consisting of the trap-nest record of the total number of eggs produced by that hen from

* U.S. Dept. of Agriculture, Bureau of Animal Industry, Bulletin 110, Parts I. and II.

November 1st of the year in which the bird is hatched to November 1st of the following year. In the absence of records of egg production during the entire lifetime of a hen, and of extensive data of any longer time unit, this "first year's egg production" has been taken as a measure of the total ability of a bird to produce eggs. Although not a precise measure of such ability, the first year's production is believed to have a high value for the purposes of inquiry, in that the egg production in this first year is the greatest in the lifetime of the hen and decreases each subsequent year, so that the first year's production, on an average, constitutes a considerably larger part of the unknown total production than does that of any other equal period of time. Again, the period is a sufficiently large unit to include the influence of season, as well as other influences such as, for example, the original mating season, time of moulting, and the like.

Records are available of the first year production of eggs in 1899-1900 of 70 Barred Plymouth Rocks and 70 White Wyandottes; in 1900-1901 of 85 Barred Plymouth Rocks and 72 White Wyandottes; in 1901-2 of 48 Barred Plymouth Rocks and 33 White Wyandottes. After this year Barred Plymouth Rocks only were used. In 1902-3 records are available for 147 birds, in 1903-4 for 254, in 1904-5 for 283, in 1905-6 for 178, and in 1906-7 for 187 birds. The years 1902-3, 1903-4, 1905-6, and 1906-7 were, however, abnormal years, the records for 1903-4 and 1906-7 relating to eleven months only, and those for all four years being affected by mishaps. Owing to these defects in the statistics, the data for one year are probably not strictly comparable with those for any other year. The statistics for each year have to be treated separately, and whenever comparisons between years are made, great caution has to be exercised in drawing conclusions.

Variation in Annual Egg Production.—The statistics are examined by the methods of biometrical analysis. Omitting the mathematical conclusions reached, it may be said that there was no marked change in the average annual egg production. The following table shows the changes in average annual production between 1899 and 1907 in the case of Barred Plymouth Rocks, corrections being applied to the

figures in the years stated above to have been abnormal by adding allowances to the actual figures so as to give the highest probable yield in these years.

Year.	Birds completing the year.	Eggs laid.	Actual average production.	Corrected average production.
1899-1900	70	9,545	136'36	136'36
1900-1901	85	12,192	143'44	143'44
1901-1902	48	7,468	155'58	155'58
1902-1903	147	19,906	135'42	159'15
1903-1904	254	29,947	117'90	129'14
1904-1905	283	37,943	134'07	134'07
1905-1906	178	24,827	140'14	154'09
1906-1907	187	21,175	113'24	142'07

The percentage of extremely high layers (producing more than 195 eggs in the first year of production) in the flock decreased during the period from 1899 to 1907. The percentage of exceptionally poor layers (producing less than 45 eggs in the first year of production) in the flock increased during the period. The general characteristics of variation in annual egg production in White Wyandottes were found to be essentially similar in the years during which they were tested to those of variation in Barred Plymouth Rocks.

Variation in Monthly Egg Production.—The question of the variation in egg production at different times of the year is extremely important both from a practical as well as a theoretical point of view. The differences in the production of eggs at different seasons cause corresponding differences in the prices of eggs, so that the value of a hen depends upon the time of production of eggs in addition to the total amount produced annually. A bird with a large egg production may bring in less money in a year than a bird laying very considerably fewer eggs, but producing them at a time when prices are high. The aim of the practical poultry keeper is, therefore, to increase as much as possible his winter egg production.

The table on p. 662 shows the average egg production per hen per month at the Maine Experiment Station, both in absolute figures and as a percentage of the annual production.

It will be seen that of the total annual production of 128'86 eggs, 28'02 per cent. (or 36'12 eggs) were produced in the

winter months from November 1st to March 1st. In this third of the year, therefore, only about two-sevenths of the total number of eggs were laid. Between November 1st and July 1st 73·29 per cent. was produced, *i.e.*, in the first two-thirds of the laying year nearly three-fourths of the year's eggs were laid. From March 1st to June 1st 35·60 per cent. of the total number of eggs was produced; in this particular

Month.	Production per Hen per Month.	Production from November 1st to end of Month.	Percentage of Annual Production during Month.	Percentage of Annual Production between Nov. 1st and end of Month.
	No.	No.	Per cent.	Per cent.
November .	4·63	4·63	3·59	3·59
December .	8·91	13·54	6·91	10·50
January .	11·71	25·25	9·08	19·58
February .	10·87	36·12	8·44	28·02
March .	16·11	52·23	12·50	40·52
April .	15·85	68·08	12·30	52·82
May .	13·92	82·00	10·80	63·62
June .	12·46	94·46	9·67	73·29
July .	10·87	105·33	8·44	81·73
August .	9·84	115·17	7·64	89·37
September .	8·19	123·36	6·36	95·73
October .	5·50	128·86	4·27	100·00
Total .	128·86	—	100·00	—

quarter of the year, therefore, a little more than a third of the eggs were laid.

The average monthly production is lowest in November, and increases in December and January at a relatively very rapid rate. There is a slackening in the rate of increase in February probably due to the end of the winter cycle of egg production being reached. This February slackening amounts in many cases to an actual decrease in productiveness compared with January. The average monthly production reaches its maximum in March, this production being maintained throughout April, but there is a steady decline after April to the end of the laying year in October. There is a tendency towards a slightly larger decrease in May, this month being the period of natural broodiness.

The laying year may be divided into four natural periods or cycles. The first (November 1st to March 1st) is the winter period in which egg production is essentially a forced process.

The second (March 1st to June 1st) is the natural laying period of the domestic fowl in its normal reproductive cycle. The third (June 1st to September 1st) and fourth (September 1st to October 31st) are periods not sharply separated from one another. The summer egg production represents in part a natural continuance of the normal breeding season, and in part a stimulated process. This period is terminated by the moult, which is the characteristic feature of the fourth period.

Effect of Selection on Production.—It is by no means certain that there has, in recent times, been any marked amelioration in the innate qualities on which high egg production depends. The egg production of a given number of hens is, of course, on the average greater than it was fifty or a hundred years ago, but the increased production is quite possibly due entirely to the improved methods of management, which, had they been in vogue in earlier times, would have resulted in just as large a production as at present. The six best birds at the Maine Experiment Station have given an average production of 240 eggs per bird, an amount which seems to have been equalled in some cases fifty years ago (*e.g.*, it is stated in the Journal of the Royal Agricultural Society of England for 1851 (p. 169) that hens of the best laying varieties will lay in a season from 160 to 270 eggs each).

Throughout these experiments there was an increase in the stringency of selection due to the fact that there was a decrease in the number of birds producing over 160 eggs; consequently the variation exhibited in the selected stock became steadily smaller, both absolutely and in proportion to the whole flock. It was not possible to find the effect of selection on egg production by tracing the production of parent and offspring, or by ascertaining the degree of inheritance of the character and comparing the variability in successive generations following selection, as no records were kept at the Station by which it could be told what birds were the parents of any particular offspring. It was simply known that the eggs of high-producing hens were incubated, and the conclusions have to be deduced from data based on results obtained from the flock as a whole. These data show that the annual egg production has by no means tended to increase during eight years; the proportion of exceptionally high producers decreased, and

the proportion of extremely poor producers increased. There is no evidence that the quality of high egg productiveness was any more fixed in the breed at the end of the experiments than it was at the beginning. During the last three years of the experiments it was shown that a relatively small environmental change is able to produce a very large difference in the average egg production in flocks of hens of exactly the same selected ancestry. Such a result could not occur if the character had been fixed by selective breeding.

With regard to monthly production, it was found that selection in this way for increased annual production had no beneficial effect on winter egg production, and it was even found in the experiments that the variability in monthly egg production was adversely affected. It is stated that there is no doubt that this system of selection failed to attain its desired end, *i.e.*, increased egg production.

Effect of Housing on Production.—The influence of environment on production, and the importance of this factor in drawing any conclusions as to the effect of breeding on egg production, are shown by some experiments which were conducted from 1904-5 onwards as to the relation of the amount of floor-space per bird to egg production. The birds were divided into flocks of 50, 100, and 150 birds each, and put into pens with floor-space such that in the pens containing 50 and 100 birds there were 4·8 square feet of floor-space per bird, and in the pens containing 150 birds there were 3·2 square feet. This small environmental difference in one year produced relatively great changes in average annual egg production. The average annual egg production per bird was found to be distinctly lower when the hens were kept in flocks of 100 birds each than when they were kept in flocks of 50 birds each, though the number of square feet of floor-space was the same in both cases. The production was also distinctly lower when the hens were kept in flocks of 150 birds each than when kept in flocks of 50 and 100 birds each, the floor-space in this case being smaller. In both cases, however, the difference was found to lie almost entirely in the economically unimportant summer egg production; the winter egg production was not adversely affected by keeping

the hens in 100 and 150 bird flocks and allowing as little as 3·2 square feet per bird. The reason for this was, presumably, that where the flocks were crowded the birds benefited from their animal heat during the winter months. On the other hand, during the summer the hens suffered greatly from the heat owing to their crowded condition.

Mushroom cultivation is carried on in France in the suburbs of certain large towns, such as Paris and Bordeaux, old abandoned quarries of building stone, chalk, or plaster being commonly utilised for the purpose. The production in the suburbs of Paris is very large, and is sufficient to supply nearly the whole of the local demand of that city, while a substantial export trade also exists, especially to London. It is estimated that the cultivation in the outskirts of Paris gives employment to 1,500 workers, and the daily production during the summer is 500 cwt. of mushrooms.

**Mushroom
Cultivation in
France.***

In Loir-et-Cher the annual production reaches 10,000 cwt., the price being 30s. to 45s. per cwt. The cultivation is also of importance in Garonne and Gironde, where in 1880 as many as 5,000 workers were employed, although in this district the industry has recently not been so successful. The present annual production is some 16,800 cwt., from 113 quarries, and the price in Bordeaux is 40s. per cwt.

The cultivation of mushrooms in France tends at the present time to increase, chiefly on account of the gradual rise in the price of mushrooms which has occurred in the last ten years. The total annual production is estimated by the syndicates of French mushroom cultivators at 128,000 cwt., valued at £320,000. The expenses of cultivation are mainly in respect of manures and labour. Horse dung is the only manure recommended, and should be strawy and of good quality. Peat moss litter does not give satisfactory results. Manure of good quality is becoming increasingly difficult to obtain, and

* *Bulletin Mensuel de l'Office des Renseignements Agricoles*, June, 1911.

the cost has risen in consequence. It is said that a limit is placed on the extension of mushroom cultivation round Paris owing to the lack of manure of suitable quality. At the present time there is also great difficulty in getting well-selected spawn: the so-called selected spawn usually sold produces varieties of which the yield is poor both as regards quality and weight. The price of this spawn makes it less profitable than that produced by the cultivators.

The labour required is considerable, and the workers need to be experienced. Wages in the neighbourhood of Paris are at the rate of 5s. per day of ten hours. A foreman, eight labourers, a picker, and a carter are required for 8,000 beds of 6 feet each. The foreman is paid about £10 per month, with an additional $\frac{1}{2}$ d. or 1d. for every basket of 22 lb. of mushrooms produced. During recent years wages have increased.

THE fifth International Dairy Congress was held at Stockholm from June 28th to July 1st. The members of the

International
Dairy
Congress.

Congress comprised delegates from most of the countries of Europe, and the Board of Agriculture and Fisheries were represented by Mr. E. G. Haygarth Brown.

The following is a summary of the conclusions arrived at by the Congress:—

Effect of Foods on Milk.—The first question considered with regard to milk production was the effect of different foods on the quantity and quality of milk. The Congress came to the conclusion that it has been established that certain foods have an influence upon the fat content of the milk of the majority of good milch cows, but they considered that several points in connection therewith required further investigation.

Milk Control Associations.—In view of the results which have been obtained by milk control societies in Sweden, Denmark, Norway, Holland, Germany, Finland, and Austria, the Congress expressed the view that such societies were instrumental in improving breeds of dairy cattle and in contributing to a reduction in the cost of milk production. They

drew attention to their importance in initiating a rational and economic method of feeding and in encouraging the keeping of a regular system of accounts.

Veterinary Control of Milk.—The Congress appointed a special committee for the purpose of drawing up regulations with regard to a system of veterinary control of milk, and these regulations will be submitted for the consideration of the next Congress. In the first place, however, the Congress expressed the desire that dairy associations should use their efforts towards introducing a system of veterinary control of milk into all towns and other large centres of population.

Composition of Milk.—The recommendations as to the composition of fresh milk intended for consumption, referred rather to the general characteristics of the milk than to the proportion of fat. The Congress stated that milk destined for consumption should be milk to which nothing has been added and from which nothing has been abstracted, and which fulfilled the following, among other, conditions:—

(a) The milk should be that of dairy cows in good health, well kept and well fed. No spoilt feeding stuff, no excessively watery food, and no food which imparts a flavour to the milk should be given to dairy cows, or should be given in small quantities only. In the case of animals receiving medicine which might pass into the milk, the milk should not be placed on the market.

(b) Immediately after milking, the milk should be filtered and cooled.

(c) The milk intended for consumption should preferably be a mixture of all the milk of at least three cows.

(d) A minimum fat and albuminoid content should be fixed, but local conditions should be taken into account in fixing the exact amount.

(e) The milk should be handled exclusively by healthy and expert persons, and with every desirable precaution towards ensuring cleanliness.

The Congress also passed resolutions relating to condensed and dried milk. The composition of cheese will form a subject of discussion at the next Congress, but preliminary steps for a consideration of the subject are being taken.

THE fifth report of the President of the Board of Agriculture and Fisheries as a Commissioner of Woods is included in the recently issued eighty-ninth report of the Commissioners of his Majesty's Woods, Forests, and Land Revenues (H.C. 205, 1911).

**The Agricultural
Estates belonging
to the Crown.**

The principal agricultural estates belonging to the Crown and under the charge of the President of the Board of Agriculture and Fisheries as a Commissioner of Woods comprised at March 31st, 1911, about 63,480 acres, divided as follows, viz.:—7,124 acres let for small holdings and allotments; 56 farms containing between 50 and 250 acres; 60 farms containing between 250 and 500 acres; 25 farms containing between 500 and 750 acres; 1 farm containing between 750 and 1,000 acres; 6 farms containing upwards of 1,000 acres, consisting largely of downland; about 357 acres of grass land, the grazing of which is let annually in lots by auction; and about 2,500 acres of woodland.

The acreage of land let for small holdings and allotments up to March 31st, 1910, was 6,689, and that of the land so let to March 31st last 7,124, being an increase during the past year of about 435 acres, and a total increase of about 6,131 acres in the last five years. During the time that Lord Carrington has had the management of the agricultural estates there have been erected for small holders 58 new cottages and 41 sets of farm buildings; 28 cottages have been substantially altered or improved, and the homesteads and buildings on the farms which were divided into small holdings have been remodelled to fit them for the use of 30 small holders. On the 435 acres let for small holdings during the current year, nine new cottages and 11 new sets of farm buildings are being or are about to be erected. Arrangements are in hand for letting a further area of land for small holdings and allotments.

The gross receipts during the year ended March 31st last from these estates amounted to £66,198, as compared with the average annual gross receipts (exclusive of the receipt from the sale of produce and live and dead stock on farms then in hand) of £60,969 for the three years to March 31st



WART DISEASE ON POTATO FOLIAGE.



1910, showing an increase of £5,229. The average gross receipts (exclusive of receipts from farms in hand) for the three years to March 31st, 1907 (the year in which the management of the agricultural estates was taken over), was £53,991, so that during the time Lord Carrington has had the management of the estates the gross receipts have increased by £12,207.

A scheme for the management of the woods at Delamere, County Chester, comprising about 2,000 acres, is being carried out, and during the past year an area of about 52 acres has been replanted.

A LARGE number of cases of Wart Disease or Black Scab in potatoes have been reported to the Board during the present season. In nearly every instance, however, the outbreaks have occurred in districts in which the disease has been present for years, and in the great majority of cases on allotments and small gardens. Several places in which disease was recorded in previous years have been ascertained to be free from disease this year. These are of two kinds : first, those outside the infected area, where the evidence shows that the original outbreak was due to infected seed, and not to infected soil ; secondly, those, chiefly within the infected area, where the growers have planted one of the varieties recommended by the Board as resistant under ordinary circumstances. It is satisfactory to be able to report that there are a large number in the latter category.

**Wart Disease
of Potatoes.**

The hot weather of the past summer does not appear to have had much effect in checking the development of the fungus. Badly infected localities, where no precautions have been taken, have yielded potatoes as badly infected as ever, and very few growers who had disease in 1910 escaped in 1911, except where disease-resisting varieties have been grown.

The disease, however, has often appeared in a different form. The warty outgrowths which are characteristic of the attack have appeared on the stem and leaves, as well as on the tubers, and cases have been reported where the whole of the disease has appeared on the parts of the plant above the ground, while the tubers remained free.

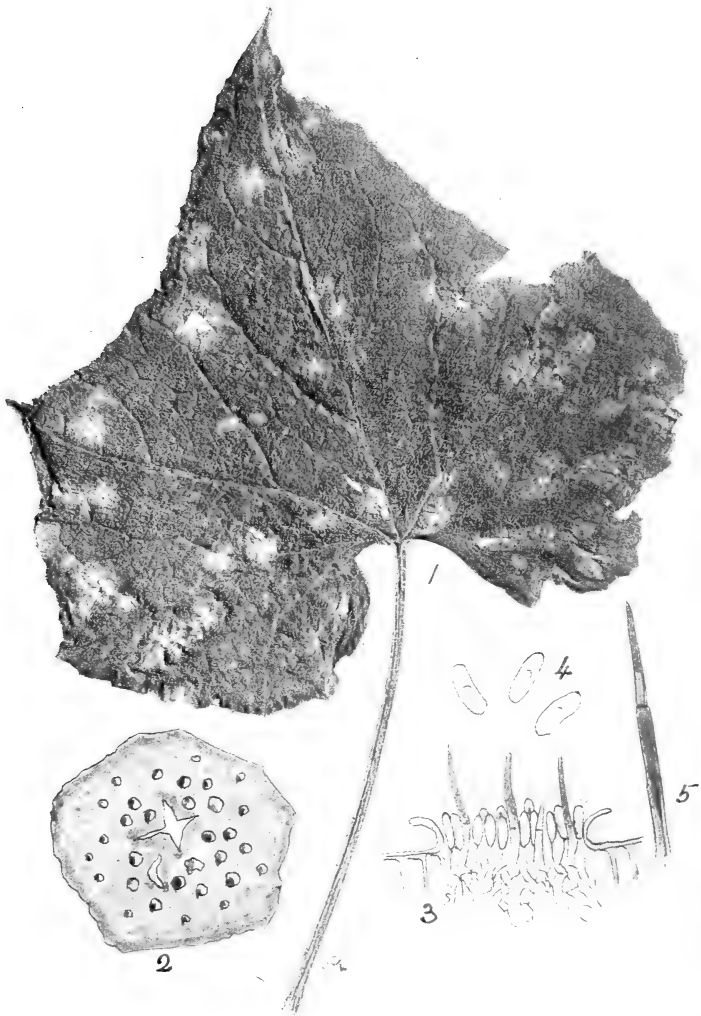
The illustration shows a stem of a potato plant bearing leaves which have been entirely distorted by the fungus. Another case has been found where an underground branch of a potato plant bore a healthy tuber and at the end of the shoot a leaf as badly distorted as the leaf shown in the figure. The appearance of the fungus on the part of the plant above ground has been of great assistance in the detection of disease.

During the present year examples of a disease known as *Colletotrichum oligochaetum*, Cavari, which attacks melons, cucumbers, and other cucurbitaceous

**A Cucumber and
Melon Disease
New to Britain.**

plants, have been sent to Kew for investigation from various districts in England. The disease is prevalent in France and Italy. Every part of the plant is liable to attack, and seedlings are often killed in large numbers, owing to the seed-leaves or cotyledons and stem being destroyed. When the soil becomes infected the young plantlets are frequently destroyed before they appear above ground, but older plants do not succumb so quickly. On the stem the spots are elongated, one to two inches in length, and of a pale yellowish-green colour. On the lateral branches the spots are similar to those on the stem, but smaller, and the entire shoot soon turns yellow and dies off, showing a soft, watery consistency. On the leaves the spots are more or less circular in outline, rarely more than half an inch across, at first yellowish-green, becoming yellowish-brown, and darker towards the edge. The diseased tissue becomes dry and cracked within a few days after infection, but the dead portion never falls away entirely, and does not leave a clear-cut margin to the hole, as is the case when a leaf is attacked by *Hormodendron hordei*. When the fruit is attacked, deep sunken patches two to four inches long are formed near the tip. The entire fruit soon after being affected changes to a pale yellow colour and dies. Very young fruit dies within two or three days after infection and before sunken patches have time to appear. In every instance minute pustules or warts of a pinkish colour at first, afterwards yellowish-brown, appear on the diseased patches. These represent the fruit of the fungus,





CUCUMBER AND MELON DISEASE.
(*Colletotrichum oligochaetum*, Cavari.)

1. Cucumber leaf, showing early stage of the disease (nat. size).
2. Diseased patch, showing the pustules of fungus fruit (slightly magnified).
3. Section through a pustule, showing origin of spores and black spines (highly magnified).
4. Free spores (highly magnified).
5. A free spine (highly magnified).

and consist of a mass of colourless spores mixed with slender blackish spines. These spores are capable of germination the moment they are mature, and are readily dispersed by syringing and other agencies.

Neither flowers of sulphur nor Bordeaux mixture checks the progress of this disease when once fairly established, but, on the other hand, a solution of liver of sulphur—1 oz. dissolved in three or four gallons of water, depending on the relative "hardness" of the foliage—arrests its progress, as also does "self-boiled lime-sulphur mixture." Diseased leaves and fruit should be removed during the early stage of the disease, before the spores are mature. If this precaution is neglected the houses become infected, and the epidemic becomes more serious and more difficult to combat year by year, as has recently been the experience of growers in the case of *Hormodendron hordei*, from an epidemic of which one grower lost £2,000 in one year.

The Thirteenth Session of the International Statistical Institute was held at The Hague from the 3rd to the 8th of September last. The British Government were officially represented by Major Craigie, C.B., and Mr. Rew, the other British members of the Institute who attended being Sir Athelstane Baines, C.S.I., Mr. T. A. Coghlan, I.S.O., and Mr. A. L. Bowley. Captain Muirhead Collins, C.M.G., attended as official representative of the Commonwealth of Australia.

The Session was opened by H.R.H. Prince Henry of the Netherlands, and the Prime Minister was also present and welcomed the Institute on behalf of the Government. The delegates and members were subsequently received by H.R.H. Prince Henry, and official receptions were given by the Government and by the cities of Amsterdam and Rotterdam.

Signor Bodio was re-elected President, and two vacancies in the list of Vice-Presidents, caused by the death of M. Levasseur and the retirement of Dr. Lexis, were filled by the appointment of M. de Foville and Dr. Von Mayr. M. Methorst was elected as General Secretary, Major Craigie

was re-elected as Hon. Treasurer, and Mr. Rew was appointed one of the Auditors.

The work of the Session was divided between three sections, viz.: (1) Demography and Statistical Method; (2) Economic Statistics; (3) Social Statistics.

In Section I., M. Meuriot's report on Urban Agglomerations contained suggestions for meeting the difficulty of obtaining a definition of a "town" for the purpose of comparing urban and rural populations in different countries.

The work of the second section was naturally of most importance from the agricultural standpoint. M. Yves Guyot's paper on agricultural production, gold production, and prices, Dr. Foldes's report on the statistics of corn prices, and Mr. Rew's final report on international fishery statistics, especially dealt with subjects coming within the sphere of the Board of Agriculture and Fisheries. M. Ricci, one of the two special delegates from the International Agricultural Institute, submitted for the consideration of the International Statistical Institute certain questions as to the standard to be taken in estimating the yield of crops and the adoption of uniform methods in the preparation of crop reports from different countries. A commission was appointed to examine the whole question, Major Craigie being elected as the representative of this country upon it. As the result of a paper read by M. March, a recommendation was adopted that international statistics of motive power should be collected on a uniform plan, a subject upon which the inquiries of the Board in connection with the Census of Production will throw some light in respect of motive power used in agriculture.

A number of other important papers and reports dealing with various branches of statistics were read.

Certain questions of general interest were considered in the General Assembly of the Institute, amongst them being the proposal for the establishment of an International Statistical Bureau. This was discussed at considerable length, and eventually a resolution in favour of the establishment of a permanent Bureau of the Institute was approved, and the consideration of ways and means was referred back to the special commission (upon which Sir Llewellyn Smith

and Mr. Rew are the British representatives), to consider the question with the Bureau of the Institute and to report to the next Session at Vienna in 1913.

SUMMARY OF AGRICULTURAL EXPERIMENTS.*

SOILS AND MANURING.

Flow of Air and Water through Soils (*W. H. Green and G. A. Ampt, Jour. Agric. Science, Vol. IV., Part I., May, 1911; Cambridge University Press*).—This paper gives an account of experiments designed to show an accord between certain theoretical expressions for the permeability of soil and experimental results. It is recognised that the mechanical analysis of a soil is no guide to one of the most important factors of fertility—the permeability of the soil to air and water. What is required is a quantitative expression of the relations of the soil to the movements of air and water through it. The authors conclude that the required relation can be stated in terms of three constants dependent on the mechanical constitution of the soil in regard to the composition, size, and arrangement of its particles, and measured by (a) the specific interstitial space; (b) the permeability to water; and (c) the surface tension. These constants are liable to vary, however, when the soil is disturbed in any way. Mathematical expressions for these constants, in terms of quantities capable of measurement in relation to a laboratory sample contained in a glass tube are given, and the modifications necessary according as the soil moisture travels upwards, downwards, or horizontally, are evaluated. The paper concludes with a verification of these formulæ by means of laboratory experiments on three classes of soil enclosed in a glass tube. The apparatus used is fully described and illustrated. The authors suggest that the evaluation of these constants is of more importance than, and should replace, the measurement of the size of the soil particles, as is ordinarily done by means of the “mechanical analysis” of a soil.

Absorption of Ammonia from the Atmosphere (*A. D. Hall and N. H. J. Miller, Jour. Agric. Science, Vol. IV., Part I., May, 1911; Cambridge University Press*).—The object of this investigation was to find whether the soil usually absorbs ammonia from the atmosphere or gives it off. The proportion of ammonia in the air is in any case exceedingly small, but the question is of some importance in attempts to construct a balance-sheet for the nitrogen received by and removed from an experimental plot over any length of time. Attempts to measure the amount of ammonia absorbed or given up by a current of air drawn through a tube filled with soil were unsuccessful, no appreciable effect being observed in the small scale experiment carried out. The method was then employed of exposing dishes of dilute sulphuric acid to the air. A pair of dishes was exposed at each of

* A summary of all reports on agricultural experiments and investigations recently received will be given each month. The Board are anxious to obtain for inclusion copies of reports on inquiries, whether carried out by agricultural colleges, societies, or private persons.

three different situations at Rothamsted, one dish in each pair at about two inches above the ground, and the other at about four feet. Dishes were thus exposed for two years, and the contents were analysed and changed monthly. The highest average amount of ammonia collected in a year represented 1533 lb. per acre of nitrogen. This was in the lower dish over arable land. The amount is, however, partly due to evolution of ammonia from the soil after the application of ammoniacal manures. Leaving out of account, however, the period in which the influence of these manures is noticeable, absorption was greater for the higher dishes than the lower, and greater over arable land than over grass, except where chimneys near the grass land contaminated the air. The dishes were covered with fine gauze in order to exclude insects and as much dust as possible, and to this precaution the authors attribute the much smaller amount of nitrogen absorbed than in similar experiments abroad. The smaller absorption by the acid close to the soil is attributed to the less frequent renewal of the air around the dishes than at a greater height, but it might be taken to be due to reduction in the ammonia in the air close to the soil owing to absorption by the soil. On the other hand, any absorption by the soil would have been expected to be greater over arable land than over grass, and the larger amount of nitrogen collected by the acid over arable land would not accord with this view. Until it has been determined whether there is any difference in the ammonia content of the air at the two heights dealt with here it is impossible to come to any definite conclusion as to whether the soil is absorbing or giving off ammonia. It can be concluded with some confidence, however, that if the soil normally absorbs ammonia the total amount of absorption is very small. Even assuming that the soil is as effective an absorbing agent as the sulphuric acid used in the experiments the maximum absorption per annum amounts to less than a pound per acre, a quantity that would be negligible in any estimates of the gains and losses of nitrogen on a given piece of land under any method of treatment.

Calcium Cyanamide and Nitrate of Lime (*James Hendrick, Jour. Soc. of Chem. Industry, No. 9, Vol. 30, May 15th, 1911*).—This paper contains a short account of the experiments with nitrogenous manures which were noticed in this *Journal* for May, 1910, p. 134, and gives the results of additional trials carried out in 1909. Nitrate of lime has generally given better results than other nitrogenous manures. Many of the soils in the north-east of Scotland are very deficient in lime, and the superiority of this manure in the district is attributed to the lime contained in it.

Green Manuring (*Rept. on the Woburn Field Expts., Jour. Roy. Agric. Soc., Vol. 71, 1910*).—Tares, rape, and mustard were grown in 1909 and ploughed in, and the effect of mineral manures was compared with that of lime in the case of each green crop. The crop grown in 1910 was wheat, the average yields from the two tares plots being 14·7 bush. per acre, from the two rape plots 21·6 bush. per acre, and from the two mustard plots 22·3 bush. per acre. Lime proved superior to mineral manures with each green crop, a result possibly due to the depletion of the soil in lime. The results show that on a soil such as that of Woburn mustard is a better crop for ploughing-

in green than tares. It is now proposed to vary the experiment by growing the green crops as before, but feeding them on the land to sheep instead of turning them in green.

Use of Lime (*Rept. on the Woburn Field Expts., Jour. Roy. Agric. Soc., Vol. 71, 1910*).—The crop grown on "Butt Furlong" in 1910 was wheat. This was sown on November 13th, 1909, and a dressing of 10 cwt. ground lime per acre was given to one plot on November 23rd. This is the second dressing of 10 cwt. ground lime applied to this plot, the first having been given in the autumn of 1907. A second plot under the experiment was given 2 tons per acre of lump lime in 1907, and has received nothing further.

The yield from the application of ground lime was 4 bush. more per acre of wheat than on the plot treated in 1907 with 2 tons per acre of lump lime. This latter application, however, gave in 1908 $10\frac{1}{2}$ bush. more of barley than the ground lime, so that there still remains a balance in favour of the lump lime.

Experiments with Nitrogenous Top-dressings (*Rept. on the Woburn Field Expts., Jour. Roy. Agric. Soc., Vol. 71, 1910*).—Top-dressings of 1 cwt. sulphate of ammonia per acre and of calcium cyanamide, calcium nitrate, and nitrate of soda, in such quantities as to supply as much nitrogen as that contained in 1 cwt. sulphate of ammonia were given in 1910 to oats and mangolds. In addition, 3 cwt. mineral superphosphate per acre was given to the land under oats, and a dressing of 12 tons dung, 3 cwt. superphosphate, 1 cwt. sulphate of potash, and 2 cwt. salt per acre to the land under mangolds.

The results in the case of oats confirmed those of the previous year, viz., that when the same amount of nitrogen is applied to corn crops it does not matter much in which form of these nitrogenous top-dressings it is given.

With the mangold crop sulphate of ammonia was less beneficial than the other three nitrogenous manures.

In order to ascertain the residual manurial value of these nitrogenous manures, wheat was grown in 1910 on plots which in 1909 were under mangolds and had received the same manures as those stated above to have been given to mangolds in 1910. Nitrate of soda and sulphate of ammonia were found to leave no residue, but gave rather a lowering of the produce compared with a plot on which no nitrogenous top-dressing had been given in 1909. Calcium cyanamide and calcium nitrate gave a small increase, possibly due to the lime supplied by them, but Dr. Voelcker remarks that there is nothing at present to lead one to think that, in regard to the new nitrogenous manures, their lasting effect requires to be taken into serious consideration.

The Woburn Pot-Culture Experiments, 1909 (*Jour. Roy. Agric. Soc., Vol. 71, 1910*).—The Woburn pot-culture experiments of 1909 dealt with the influence of salts of various metals on cereals, the influence of lime and magnesia in different forms on wheat, the influence of lime on a soil rich in magnesia, the influence of magnesia on clover and beans, green manuring experiments, experiments with nitrogenous top-dressings, and experiments on the inoculation of crops.

From the experiments with lithium and caesium, which have now

been conducted for several years, it is concluded that salts of lithium, supplying the lithium in not greater quantity than 0.002 per cent. of the soil will do no harm, but that when given above that quantity they will have an injurious effect on the wheat plant. Caesium salts, on the other hand, would so far appear to have no injurious effect, even when used in amounts to give 0.0036 parts of the metal to 100 parts of soil. Zinc oxide, chloride, sulphate and carbonate, in such amounts as to supply 0.04 parts of zinc per 100 parts of soil, were found to exert a toxic effect, the injury being the greater with the more soluble salts. Experiments with iron and manganese have shown that small quantities of these metals have a distinctly stimulating influence on barley.

The experiments as to the influence of lime and magnesia in different forms on wheat showed burnt lime to be inferior to ground limestone, whether coarse or fine, and magnesian limestone, whether burnt or not, to be inferior to pure carbonate of lime.

With regard to the influence of lime on a soil rich in magnesia, a soil was selected containing 2.29 per cent. of magnesia and 0.83 per cent. of lime. The addition of lime to the soil to make the total amount equal to 1.50 per cent. had no effect on the yield of grain, and additions of lime beyond the amount decreased the yield.

The result of adding magnesia to a soil on which clover and beans were grown was to lower the produce from these crops.

Experiments in 1908 showed that an alteration in the consolidation of the soil, produced by the addition of materials, such as silicate of alumina and silicate of soda, exercised a marked influence in bringing out the benefit of the previous green manuring, and this was confirmed in 1909.

Pot experiments on the comparative values of sulphate of ammonia, nitrate of soda, calcium cyanamide, and nitrate of lime as top-dressings for wheat and barley led to the conclusion that, provided the same amount of nitrogen is supplied, there is little to choose between the four manures.

The results of experiments with inoculating materials on leguminous and non-leguminous crops were variable in character: on the whole, there was nothing to indicate an improvement from inoculation.

Manuring of Old Pasture (*Rept. on the Woburn Field Expts., Jour. Roy. Agric. Soc., Vol. 71, 1910*).—These experiments have been carried out in Broad Mead since 1901, the manures being applied in 1901, 1904, 1906, and 1909. The yields in 1910 were as follows:—

	Cwt. per acre
No manure	25
12 tons farmyard manure	38
10 cwt. basic slag, 1 cwt. sulphate of potash	35
5 cwt. mineral superphosphate, 1 cwt. sulphate of potash	27
10 cwt. basic slag, 1 cwt. nitrate of potash	32
2 tons lime	22

The hay on the farmyard manure plot was coarse, with little clover in it. The results of the botanical examination of the herbage were similar to those of previous years, the highest proportion of leguminosæ being found on the plots to which sulphate of potash had been applied, and the lowest on the nitrate of potash and basic slag plot.

Green Manuring (*Rothamsted Expt. Station, Annual Report, 1910*).

—For some years on the same field, plots of mustard, vetches, crimson clover, and rape have been grown and ploughed in, in order to ascertain which would have the best effect in preparing the ground for a subsequent straw crop. The last straw crop was in 1907; the green crops were repeated during 1908 and 1909, and wheat was again taken in 1910. The yields of wheat after the various green crops were as follows:—Mustard, 19'6 bush.; rape, 20'8 bush.; crimson clover, 30'8 bush.; vetches, 34'4 bush. The yield after vetches was greater than on any other experimental plot in 1910. As in the previous trial the value of the leguminous crops as a preparation for wheat was very marked, the yield of grain being 60 per cent. better after either vetches or crimson clover, than after rape or mustard. The yield of straw was even more favourable to the leguminous crops, and it was noticeable that on all these plots following green manuring there was none of the blight which characterised the wheat elsewhere.

Manuring of Mangolds (*Lancs. C.C. Educ. Com., Agric. Dept., Farmers' Bull. No. 19*).—Trials with farmyard manure and artificials for mangolds have been carried out since 1907 at different centres on plots of $\frac{1}{20}$ acre in size. A large dressing of farmyard manure (25 tons per acre) did not give a sufficient increase in yield over a medium dressing (15 tons) to pay for the extra manure. Farmyard manure (15 tons) and artificials compared with farmyard manure alone resulted in a profit of 19s. 8d. per acre, after paying for the extra cost of the artificials. Incomplete dressings of artificials have not given so much profit per acre as complete dressings, e.g., the profit after deducting the cost of the manures was 31s. 1d. per acre in the case of a complete dressing of nitrate of soda, superphosphate, and kainit, while the effect of omitting kainit or both kainit and superphosphate was to reduce the profit to about 13s. per acre. Doubling the dressing of nitrate of soda (2 cwt. instead of 1 cwt.) in the complete dressing of artificials produced no result. The addition of even a small dressing of salt costing only about a shilling, raised the yield and profit per acre considerably. It must be borne in mind, however, that the addition of salt may cause an actual reduction in the crop on some soils, especially if the amount of kainit in the dressing be large.

Manuring of Mangolds (*Roy. Agric. Coll., Cirencester, Scientific Bulletin, No. 2, 1910*).—An experiment was carried out on six farms with farmyard manure alone, and also with artificials.

Improvement of Old Pasture (*Edinburgh and East of Scotland Coll. of Agric., Report xxiii*).—These experiments were carried out from 1908 to 1910 in Mid-Lothian on a raw boulder clay soil situated about 500 ft. above sea-level, thickly covered with soft inferior herbage composed chiefly of bent, Yorkshire fog, ryegrass, and moss, and a good sprinkling of stunted clover plants.

It was not sought to ascertain the best manure, but to determine the improvement effected by a liberal dressing of superphosphate and potash. For this purpose two plots of four acres each were selected in the same field, and these plots were divided into two, one-half being manured in four sections with different dressings, and the other half unmanured. The whole of the manured portion received in February, 1908, $6\frac{1}{2}$ cwt. 30 per cent. superphosphate (100 lb. phosphoric

acid) per acre, while the effect of sulphate of potash in addition and of ground lime was also tested.

In 1908 the plots were stocked with newly clipped Cheviot dimonts, the unmanured plot with 11 and the manured plot with 16 sheep. The numbers were later increased to 15 and 22 respectively. In 1909 13 and 19 sheep were used, and in 1910 15 and 21. In this last year several sheep on both plots were fat by August 20th, when they were removed and the numbers made up to 14 and 20. During the winter and spring the plots were grazed along with the rest of the field till the end of the first week in June, and then reserved for the experimental sheep.

The live weight increases in the three years from the manured and unmanured plots were respectively as follows:—1908, 518 lb. and 253 lb.; 1909, 532½ lb. and 362½ lb.; 1910, 545 lb. and 325 lb. This gives an increase due to the use of manures of 655 lb. Valuing this at 3½d. per lb., and deducting the cost of the manures (£5 18s.), the profit is £3 13s. for the four acres, or 18s. 3d. per acre. The improvement due to the manures was in reality much greater. The effect of the manures was by no means exhausted by 1910, and the increase of clover, which took place on the manured plots, is likely in addition to have a beneficial influence for a considerable time. Moreover, the experimental period did not cover the whole of the grazing season, and it is estimated that this would bring the profit up to 30s. per acre.

There were no marked differences in the increases in live weight on the sub-plots due to the addition of lime or omission of sulphate of potash.

Manurial Experiments (*Shepton Mallet Grammar School, 11th Ann. Rept., 1910*).—These manurial trials have been carried on for eleven years. The crops are mixed grasses without clover, now in its seventh year on the ground, mangolds, and broad red clover, second year. The crops in 1910 and the results of the continuous manuring are given in this report. Nitrate of lime was used with good results on the mixed grasses and mangolds.

FIELD CROPS.

Breeding of Rust-resistant Wheats (*J. B. Pole Evans, Jour. Agric. Science, Vol. iv., Pt. 1, May, 1911: Cambridge University Press*).—This work is concerned with South African cereal rusts, but some of the conclusions reached are of general importance. The Black rust (*Puccinia graminis*) was the species investigated. Two varieties of wheat which are immune to Black rust in the district where the work was carried on and two susceptible varieties were crossed, and the resulting hybrids, as well as the parents, were inoculated with the rust. A number of experiments showed clearly that the hybrids were even more susceptible than the susceptible parents. This is in accordance with the results of Biffen's trials with Yellow rust (*Puccinia glumarum*). Further, it was found that the rust taken from these hybrids now readily infected the immune parent plants, and also rust from the susceptible varieties which had contracted it from the hybrids behaved in the same way. It appears therefore that a hybrid plant may, by acting as an intermediary, play an important part in the

transmission of rust from susceptible to immune varieties, and this may afford an explanation of the eventual failure of some rust-resistant varieties and of other obscure points connected with immunity.

Heating of Hay Ricks (*Biedermann's Zentralblatt für Agrikulturchemie, August, 1911*).—Analyses of heated hay from ricks having temperatures of 85° C. and 95° C. (165° F.—183° F.), and of normal hay from the same ricks, showed that heating is accompanied by a decrease in the content of the hay in pentosans and carbohydrates. The following was the actual composition of the dry matter :—

	Heated hay. Per cent.	Unheated hay. Per cent.
Ash	9'2	8'4
Protein	11'5	10'8
Pentosans	20'6	24'0
Crude fibre	35'4	31'6
Fat	3'1	2'0
Carbohydrates	20'2	23'2

The acidity produced by heating was found to be due principally to formic acid. Samples of gas from the interior of a heated rick were taken and found to consist of 7 per cent. carbonic acid gas, 12'4 per cent. oxygen, and 80 per cent. nitrogen. As the composition of the atmosphere is about 20 per cent. oxygen and 80 per cent. nitrogen, it would appear that in addition to forming carbonic acid gas, some of the oxygen (0'6 per cent.) combines with the carbon remaining in the hay.

It has been suggested (see *Journal*, June, 1908, p. 221) that heating is due to the action of bacteria, but the fact of the oxygen combining with the hay would seem to indicate that it is due to oxidation. In these experiments the number of bacteria found in the heated hay, either by microscopic examination or by obtaining gelatine cultures of the hay, was insufficient to account for the heating. Microscopic examination of a stem of blackened hay revealed a normal epidermis and a parenchymatous tissue with cell walls intact, so that bacteria could not have found their way into the interior of the cells. It appears therefore that the heating of hay cannot be ascribed to the action of bacteria.

Experiments in the laboratory seemed to confirm the opinion that heating is due to oxidation. Tubes containing hay and filled with oxygen were sealed up and heated, and the oxygen was found to enter partly into combination with the hay, in addition to forming carbonic acid gas. A greater resemblance to hay heated in the rick was obtained from tests with grass dried in a vacuum, air-dried hay having already been more or less oxidised. Further experiments showed that the effect of oxygen on hay begins at about 33° C. (95° F.), the production of carbonic acid gas, and the combination of oxygen with the hay, taking place at this temperature; and the presence of moisture was found greatly to influence this oxidation. A section of a hay stem so treated could not be distinguished either under the microscope or by analysis of dry matter from hay naturally heated in the rick.

Varieties of Wheat (*Rept. on the Woburn Field Expts., Jour. Roy. Agric. Soc., Vol. 71, 1910*).—The varieties tested were sown in November, 1909, after a well-manured potato crop. The yields were as fol-

lows (head corn, per acre):—Wilhelmina, 47'4 bush.; Red Admiral, 37'3 bush.; Cambridge No. 1 (Little Joss), 30'3 bush.; White Stand-up, 29'6 bush.; Treasure, 32'8 bush.; Sensation, 31'3 bush.; Red Marvel, 26'7 bush.; White Marvel, 25'6 bush.; Dreadnought, 22'8 bush.; and Cambridge No. 2, 20'0 bush. Cambridge No. 1 is a cross between Girkha and Square Head, and is grown for its rust-resisting properties, as well as for its good yield, whereas Cambridge No. 2 is a cross between Rough Chaff and Red Fife, and is grown mainly for its strength. The Dutch variety, Wilhelmina, was sown on March 5th, 1910, at the rate of 9 pecks per acre, and manured with a top-dressing of 8 cwt. soot per acre in May; this variety stood up well, tillered out splendidly, and gave the highest yield. Three of the French varieties, Dreadnought, Sensation, and Treasure, were so backward that re-sowing had to be carried out in March. The ordinary English variety, Red Admiral, produced a larger crop than any of the French or Cambridge wheats. The yield of Dreadnought was low, and both the Cambridge wheats were somewhat disappointing in their yields. In regard to quality, the two Cambridge wheats stood highest. Red Admiral was the better of the two English varieties, White Stand-up being inferior and weak. Of the French wheats, Red Marvel and White Marvel were the best in regard to quality, Dreadnought being a very poor sample. Wilhelmina was also considered a poor sample with very little strength.

Varieties of Lucerne (*Rept. on the Woburn Field Expts., Jour. Roy. Agric. Soc., Vol. 71, 1910*).—Three varieties of lucerne—Provence, American, and Canadian—first sown in 1905, remained on the ground in 1910. Three cuttings of each variety were obtained, the yields of green produce per acre being from Provence seed, 9 tons 8 cwt.; American seed, 9 tons 4 cwt.; and Canadian seed, 16 tons 10 cwt. As in the four previous years, the Canadian variety gave a markedly higher crop than the other two. Inquiries have failed to discover what particular variety the Canadian seed used at Woburn originally was, and the experiment has been discontinued. Fresh seed of known origin will, however, be obtained from Canada, and compared with Turkestan, Provence, and other varieties of lucerne commonly obtainable.

Growth of Sugar Beet (*Rept. on the Woburn Field Expts., Jour. Roy. Agric. Soc., Vol. 71, 1910*).—A plot of sugar beet was grown in 1910 and compared with mangolds, the two crops being grown under the same conditions. The sugar beet seed used was white Silesian beet drilled on April 26th, 1910. The crop was pulled on November 2nd, the weight of roots per acre being 12 tons 2 cwt. in the case of sugar beet, and 31 tons 12 cwt. in the case of mangolds. Analyses of samples from each crop showed the mangolds to contain 6 per cent. of sugar, and the sugar beet 14'53 per cent. of sugar. The sugar beet was grown, like the mangolds, in rows 24 in. apart, whereas for a factory they would probably be grown only 18 in. apart, and the yield might be increased by fully one quarter. On the other hand, the sugar beet was much the more expensive crop to raise.

Elliot System of Laying Down Grass (*Rept. of the Consulting Chemist, Jour. Roy. Agric. Soc., Vol. 71, 1910*).—Two samples of soil were sent to the Consulting Chemist of the Royal Agricultural Society

of England for analysis in 1910, on one of which the Elliot system of laying down grass had been adopted, and on the other an ordinary grass seed mixture had been sown and basic slag had been given in addition. The soil on which Elliot's system had been adopted contained more organic matter, nitrogen, lime, potash, and phosphoric acid than the soil on which the ordinary grass mixture had been sown, so that, presuming the soils to have been originally alike, it would appear that an improvement had been effected under the system of laying down grass advocated by Mr. Elliot.

LIVE STOCK.

The Inheritance of Milk Yield in Cattle (*Scientific Proc. of the Roy. Dublin Soc.*, Vol. 13 (N.S.), No. 7, June, 1911).—Professor James Wilson suggests in this paper, from an examination of milk records, that milk yield is a factor inherited according to Mendel's principles. Danish records, relating to the breed of Red Danish cows, were chiefly considered, as British records have seldom been kept for a long enough period to give information relating to several generations of cows, and American records usually refer to the butter yield, which depends upon both the yield and quality of the milk, factors that are inherited separately. In order to consider the performance of a cow during a lactation period, it was necessary to apply corrections to the record when the lactation period had been prolonged owing to a longer interval than the usual twelve months between two calvings, and also on account of the natural rise in milk yield with the advancing age of the cow. With regard to the latter point, Professor Wilson considers, from an examination of the records of the Irish Department of Agriculture's farms, that a cow's yield usually increases up to the birth of her fourth or fifth calf, *i.e.*, when she is six or seven years old, and that the total increase from the first to the fourth or fifth calf is on the average about 50 per cent.

The records of a number of Danish cows and their progeny for several generations are given in the paper, and Professor Wilson concludes from them that improvement in milk yield by breeding is not a slow and gradual process as has formerly been supposed. If a daughter is not on an approximate equality with her dam as a milk producer she is either much higher or much lower. He divides these cows into three grades, and suggests a Mendelian explanation of the differences between mother and daughter, *viz.*, that the extreme grades are the parent strains, and the intermediate, the hybrid. The records that have been obtained of the progeny of a few bulls also lead to the same conclusions.

DAIRYING.

Effect of Cocoa-nut Cake and Linseed Cake on the Composition of Butter Fat (*Analyst*, September, 1911).—An experiment carried out at the Midland Agricultural College on the feeding of dairy cows with cocoa-nut cake and linseed cake was summarised in this *Journal* for October, 1911, p. 597. In this paper Mr. H. T. Cranfield gives the results of the butter tests of the milk of the cows used in the experiment.

Details as to the feeding of the animals will be found as above.

The conclusions reached from the butter tests were that cocoa-nut cake produced a butter which gave a refractometer figure below the normal, while the Polenske number was very high; the Reichert-Meissl number was, however, quite normal. Feeding with linseed cake influenced the butter in respect to the Polenske number, butters from this source giving a figure much below the normal; the refractometer figure was also influenced, a distinct rise being noticeable. No very great differences were shown in the texture and flavour of the two sets of butter compared in this experiment. The butter from the cocoa-nut cake, however, had as a rule a firmer and less oily texture and better flavour than the linseed-cake butter.

Colouring of Milk (*Jour. Roy. Agric. Soc.*, Vol. 71, 1910).—This experiment consisted in examining various samples of milk with an apparatus known as a Tintometer, in order to determine the nature of the colouring matter of the milk. By the aid of this apparatus it is possible to ascertain the exact combination of dominant colours (red, yellow, and blue) necessary to match a particular shade of colour in a sample of butter or milk, and to calculate, from figures on the coloured glasses used in the Tintometer, which are graded on the basis of equivalent colour value, the percentage of black (combination of the three dominant colours in equal proportions) to either orange or yellow.

Three samples of milk were dealt with—(1) Devon, (2) separated milk coloured with annatto to resemble the Devon milk, and (3) separated milk not coloured. The milks for the purpose of examination were put into a tube graduated to show sections of milk of various thicknesses. Red, blue, and yellow glasses were used in the Tintometer, and the colours developed (whether black, orange, or yellow) by the glasses are given in the report, together with the percentage of black to orange and black to yellow colours. It is shown that the black in the annatto colouring material used dies out as density increases, whilst the black in the milk increases in density under the same conditions. The decrease of black percentage between the Devon and the coloured milk is stated to point to the use of a colouring material purer in colour than the milk, whilst the increase in the percentage of black in the separated milk when compared with the Devon is stated to be what would be expected when the butter fat has been abstracted. It is submitted that the experiment goes to show that colour measurements by the Tintometer disclose (what cannot be determined by ordinary vision) the presence of an added colour material to separated milk.

DISEASES OF LIVE STOCK.

Mortality among Calves (*Harper Adams Agric. Coll., Supplementary Bulletin to Annual Report, 1909*).—This investigation was undertaken to discover the cause of death among calves on a farm in Shropshire. Not one calf had been reared on this farm since the tenant had been in occupation, although calves brought in had thriven well.

In all cases the symptoms were a weeping from the eyes from the second to the third day, continuing until the fourth or fifth day, when it became almost purulent and inflamed the eyes. The animal then became gradually weaker, losing flesh very rapidly, and continu-

ally lying down with its head turned to one side. The muzzle was dry and milk was refused altogether. On the seventh to the ninth day the calf became powerless, passed into a comatose condition, commenced to blow, and was soon dead. On post-mortem examination the condition found was that of acute broncho-pneumonia.

Dr. Wilson, who investigated the disease, came to the conclusion that it was one of the "septicæmias" of young calves. He also considered that the infecting germ was probably taken into the body through the alimentary canal with the first sucking of the teats and withdrawal of the milk. When carried direct into the fourth stomach, the germs grow so rapidly that they soon overpower the ordinary lactic and other digestive bacteria. Three other channels of infection are possible, viz., through the navel wound, intra-uterine infection prior to birth, and inhalation of the germs with dust, &c., but no evidence was found of them.

The method of treatment adopted by Dr. Wilson consisted in disinfecting the navel as soon as the calves were born, removing the calves into a perfectly new box, and feeding them with milk containing a preparation of living lactic acid bacilli. With this treatment none of the calves born showed any symptom of illness, and are all doing well.

Acute Contagious Mastitis in Cows due to the Bacillus "Lactis aerogenes" (J. A. Gilruth, *Vet. Journal*, April, 1911).—An attack of inflammation of the udder, which affected 30 cows out of a herd of 40, was found to be due to the bacillus *Lactis aerogenes*, which had not formerly been proved to be pathogenic for bovines. Experiments with the bacillus showed that it was non-pathogenic when inoculated into the tissues of cattle, but caused acute inflammation when introduced into the udder of a cow in milk. The author suggests that many of the ordinary sporadic cases of acute mastitis so frequently observed in cows, especially soon after calving, and generally attributed to blows, chills, &c., may be due to this organism, which is common in dairy premises. The bacilli are few after the first few days after infection, and are liable to be overlooked. In this outbreak the infection was spread by means of an insufficiently cleaned milking machine.

OFFICIAL NOTICES AND CIRCULARS.

The following is a summary of the statement on this subject which appears in the Report on the proceedings of the Board of Agriculture and Fisheries under the Tithe, Commons, and

Recreation Grounds other Acts for 1910 [Cd. 5,689. Price 4½d.].

Allotted under By Section 28 of the Commons Act, 1876,
the Inclosure Acts. trustees of recreation grounds allotted under the Inclosure Acts are required to make

reports to the Board at such intervals of not less than three nor more than five years as the Board may direct, in respect of the recreation grounds under their management. Reports having last been called for in 1905, it was necessary, in compliance with the Act, again to obtain reports in 1910.

Recreation grounds set out under the Inclosure Acts were allotted to the churchwardens and overseers for the time being of the parish

in which the ground was situated, to be held by them in trust as places of exercise and recreation for the inhabitants of the neighbourhood. The Local Government Act, 1894, transferred to parish councils from the churchwardens and overseers the control and management of the recreation grounds, together with all powers, duties, and liabilities in respect thereof. A parish council has the additional power—not possessed by the churchwardens and overseers—of making and enforcing bye-laws for the regulation of the recreation ground, with all such powers as may be exercised by an urban authority under the Public Health Acts in relation to recreation grounds and public walks. In parishes where there is no parish council the recreation grounds are transferred, subject to all trusts and liabilities affecting them, from the churchwardens and overseers to the chairman of the parish meeting and the overseers.

The total number of recreation grounds set out under the Inclosure Acts from 1845 to 1910 was 350, and it appears that only 29 are still vested in the churchwardens and overseers, the remainder having been transferred to the charge of the local authorities. The reports indicate that the transfer had in many instances resulted in the improvement of the recreation grounds; and in the case of 30 the power of making bye-laws for their regulation had been utilised.

An appendix in the Report gives a summary of all the reports received in 1910, and the details therein given afford information to those interested as to the present position of the recreation grounds and the extent to which they are now available for public use. In the case of 259 it is stated that they are more or less used for the purpose to which they were dedicated. In 91 cases they were not used for recreation; but in 56 cases the herbage was let, and in 19 cases the rent was applied to the hiring of ground more suitable or conveniently situated for recreation; while in 14 other cases the rent is accumulating with a view to the purchase of other land. In 35 cases no use whatever appears to be made at present of the ground.

On no previous occasion has so exhaustive an inquiry been made into the position in regard to these recreation grounds, and in some instances there would seem to be a danger that the indifference of the inhabitants to their rights may, unless greater vigilance is exercised in the future, lead to the desuetude of the grounds, and eventually to their loss to the public. It must be admitted that in many cases under the earlier awards the piece of land allotted as a recreation ground was from its nature and situation unsuitable for the purpose. No doubt in many villages there was no public demand at the time for such an allotment, and it was made, therefore, in a perfunctory manner rather with the view to compliance with the requirements of the law, or of the Inclosure Commissioners, than in the belief that it was of any practical utility. It is thus, perhaps, not surprising that it should sometimes have been thought that any rough piece of land in the parish, which was not of much value for any other purpose, would sufficiently meet this requirement. Cases have been brought to the notice of the Board in which it is clear that the existing allotment is not, and cannot be made, suitable for purposes of recreation, and the attention of the trustees was directed to their powers of sale or exchange and to the obligation which lies upon them in fulfilment of

their trust to make use of such powers. In some other cases it was found that the herbage had been let, but that the rents had not been applied in accordance with the provisions of the Inclosure Acts.

Reference has been made to those cases in which no use whatever appears to be made of the recreation ground, but probably the danger of the loss of public rights may be even greater in those cases where the herbage is let. This is expressly permitted by the Inclosure Acts; and it is obvious that the feeding off of the grass is quite consistent with the exercise by the public of their right of using the ground for purposes of recreation. When the herbage is let the right of the parishioners to the use of the ground remains, and no agreement to let which purported to prevent such user would be valid. But there is reason to believe that in some cases the recreation ground is let to the occupier of adjoining land, and is used by him to the practical exclusion of the public, and a long continuance of a tenancy under these circumstances may, and in fact sometimes does, lead to difficulty when an attempt is made to re-assert the right of public user.

Under Section 74 of the Inclosure Act, 1845, allotments were set out in 94 cases—with a total area of 464 acres—to private individuals, subject to the obligation of maintaining the fences, preserving the surface, and permitting the land to be used for exercise and recreation by the inhabitants of the parish and neighbourhood. This section was repealed by Section 25 of the Commons Act, 1876, and as periodical reports have not been required in respect of these allotments, no information as to the present position of these recreation grounds is available except in a few cases which have been especially brought to the notice of the Board.

A list, extracted from the awards in the custody of the Board, of all the grounds which were so set out is given in the Report. The Board have no information as to the present position of these grounds, but it is not unreasonable to assume that the right of recreation has not in every instance been more effectively maintained in the case of those allotments which were entrusted to private individuals than in the case of those which were placed in charge of public authorities.

A memorandum is also printed in the Report as to the law relating to recreation grounds allotted under the provisions of the Inclosure Acts, 1845 to 1899.

At a meeting of the British Association for the Advancement of Science, held at Sheffield on September 6th, 1910, certain papers were read before the Agricultural Subsection of the Association on "The Magnitude of Error in Agricultural Experiments," and in view of the importance of the subject the Association suggested that the Board should undertake their publication with a view to securing for them a wider circulation than they would obtain if issued merely under the auspices of the Association.

This suggestion was adopted, and a collection of papers on the "Interpretation of the Results of Agricultural Experiments," by Messrs. A. D. Hall, M.A., F.R.S., E. J. Russell, D.Sc., T. B. Wood, M.A.,

The Interpretation of the Results of Agricultural Experiments.

S. U. Pickering, M.A., F.R.S., and S. H. Collins, M.Sc., has been issued as a Supplement to the present number of the *Journal*.

The object of the papers is to draw attention to the liability of errors arising in drawing deductions from agricultural experiments and to emphasise the points to which special care and attention should be devoted in preparing schemes for the carrying out of such experiments. It is hoped that they will be of service to the Governing Bodies of Agricultural Colleges and to County Education Authorities in undertaking such experiments, and also to agricultural writers and farmers by leading them to appreciate the value which should be attached to the results obtained.

The Supplement may be obtained at the Office of the Board, 8 Whitehall Place, S.W., price 4d., post free; it is supplied to subscribers to the *Journal* without extra charge.

No outbreak of foot-and-mouth disease had up to October 10th been discovered on premises outside the two adjoining parishes of Middlezoy and Othery, near Bridgwater, but within the former parish the existence of the disease had by that date been confirmed amongst the stock of nine different owners, whilst one outbreak had been detected in the parish of Othery in marshes which adjoin those in the neighbouring parish in which the disease has appeared.

The outbreaks (ten in all) have occurred amongst cattle pastured in the marshes within a radius of about a mile of the village of Middlezoy, and the later outbreaks are believed to be connected directly or indirectly with the original outbreak which occurred at Manor Farm on September 29th.

All the cattle and sheep pastured in the fields in which the disease has appeared have been slaughtered by order of the Board, and in certain cases cattle in the adjoining pastures have also been slaughtered with a view to prevent the further spread of the disease.

Animals in the vicinity have been kept under daily observation by the Veterinary Inspectors of the Board with a view to the early detection of any further cases of the disease.

In view of the fact that the disease has been confined to a comparatively restricted area, an Order was made which came into force on October 11th modifying substantially the restrictions in force in the Scheduled District as regards those parts of it more remote from the outbreaks.

MISCELLANEOUS NOTES.

Importation of Live Stock into the United States.—Regulations regarding the inspection and quarantine of live stock imported into the United States were issued on May 3rd, 1911, and supersede all previous regulations on the subject. The following is a summary of these regulations in so far as they relate to live stock imported from the United Kingdom.

Ports of Entry.—Horses, cattle, sheep, and other ruminants and swine which are subject to both quarantine and inspection must enter through the following ports:—Boston, New York, Baltimore, San Francisco, San Diego, and Port Townsend, or at certain specified stations on the boundary between the United States and Mexico and the United States and Canada.

Horses.—All horses imported into the United States from any part of the world except North America are required to pass a veterinary inspection at the port of entry, conducted by an inspector of the Bureau of Animal Industry. Horses found to be affected with any contagious disease are to be isolated, and the landing of such horses may be refused.

Cattle, Sheep, and Other Ruminant Animals.—All ruminants must be accompanied by a certificate from the local authority of the district in which they have been continuously located for six months preceding shipment, stating that no contagious pleuro-pneumonia, foot-and-mouth disease, anthrax, rinderpest, or any other disease contagious to cattle, except tuberculosis and actinomycosis, has existed in the district for one year previous to the date of shipment.

Swine.—Swine must be accompanied by a certificate similar to the one required for cattle, sheep, and other ruminants, but relating to the existence of foot-and-mouth disease, hog cholera, swine plague, and erysipelas.

Affidavit for Ruminants and Swine.—All ruminants and swine imported into the United States must also be accompanied by an affidavit of the owner, stating that the animals have been continuously located in the district whence shipped for six months preceding the date of shipment, that no contagious disease affecting the species of animals imported has existed among them, nor among any animals of their kind with which they have come in contact for the six months preceding shipment, and that no inoculation has been practised among the animals during the preceding year; and an affidavit is required from the importer, or his agent supervising the shipment, stating that the animals have not passed through any district infected with contagious disease affecting the kind of animals, that they have not been exposed in any possible manner to the contagion of any contagious diseases, and that the animals, when not driven, have been shipped in clean and disinfected cars and vessels direct from the farm where purchased. Certificates and affidavits are to be presented to the collector of customs at the port of entry.

Period of Quarantine.—The period of quarantine for cattle imported from Great Britain, Ireland, and the Channel Islands is 30 days, and for sheep and other ruminants and swine 15 days, counting from the date of arrival at the quarantine station. Cattle and sheep imported for immediate slaughter at the port of entry may be imported without quarantine. Food and attendance of animals in quarantine is to be provided by the owner of the stock; in case of omission, food and attendance will be provided by the Bureau of Animal Industry, and the cost will be recoverable from the owner.

Tuberculin Test for Cattle.—All cattle six months old or over imported from Great Britain, Ireland, and the Channel Islands directly into the United States, and which are subject to quarantine, must be

tested with tuberculin by an inspector of the Bureau of Animal Industry before being exported, or after arrival at the animal quarantine station at the port of entry; and, when considered necessary, a subsequent tuberculin test of imported cattle will be made during the last two weeks of the quarantine period. The importation of cattle reacting to the test will be prohibited, or the animals may be disposed of as specified below. Persons desiring animals tested before shipment should address the Inspector of the United States Bureau of Animal Industry, care of the United States Consul's Office, Liverpool.

Permits Required for Imported Animals.—Two permits must be obtained from the United States Secretary of Agriculture, one stating the number and kind of animals to be imported, the port, and probable date of shipment, which will, on presentation to the American Consul at the port of shipment, entitle the animals to a clearance; the other permit stating the port at which the animals are to be landed and quarantined, and the approximate date of their arrival, this assuring the reception of the number and kind of animals specified, at the port and quarantine station, on the date prescribed for their arrival, or at any time during three weeks immediately following, after which the permit will be void. Permits must be in the name of the owner of, or agent for, each separate lot of animals. Permits will be issued to quarantine at such port as the importer may elect, so far as facilities exist at such port, but in no case will permits for importation at any port be granted in excess of the accommodation of the Government quarantine station at such port.

Papers by United States Consuls.—United States Consuls have instructions to give clearance papers or certificates for animals from their districts intended for exportation to the United States only upon presentation of permits as above provided, with dates of probable arrival and destination corresponding with the permits, and in no case for a number in excess of that mentioned therein. When shipments originate in the interior of the country these permits should be submitted to the Consul of the district, and through the forwarding agent to the Consul at the port of embarkation.

Dogs.—All dogs are subject to inspection at the port of entry, and with the exception of "house dogs" are to be subjected to quarantine for a period not exceeding two weeks, or until it can be determined whether such dogs are the hosts of the tapeworm (*Tænia cænurus*). Animals found to be infected must be medically treated, and held in quarantine until free from infection of this or of other communicable disease. The ports of entry for dogs, other than house dogs, are limited to the ports specified for animals subject to both inspection and quarantine.

Inspection.—All animals imported into the United States which are subject to inspection will be carefully inspected by an Inspector of the Bureau of Animal Industry, and all animals found to be free from disease and not to have been exposed to any contagious disease will be admitted into the United States, subject to the provisions for quarantine, except as otherwise provided.

Quarantine Release.—A release from quarantine will be given to each owner for the number and kind of animals belonging to him which are discharged from quarantine, and the release will be a

certificate of fulfilment of quarantine regulations. In case an importation of animals is owned by more than one person, a release will be issued to each owner or agent covering the animals which belong to him.

Importation of Pure-bred Animals for Breeding Purposes.—The regulations relating to the duty-free importation of pedigree stock for breeding purposes were given in this *Journal* for March, 1911, p. 1029. Importers of such stock will not be required to give the bond or stipulation for the production of registry certificates, provided for by these last regulations, until the end of the quarantine period, in order that they may avail themselves of such period to procure from the Department of Agriculture the required certificates of record and pedigree.

Disposal of Diseased Animals.—Animals which are found to be suffering from a contagious disease, and animals which have been in contact with them, are only permitted to be landed and quarantined at the discretion of the Chief of the Bureau of Animal Industry, who may also order the animals to be valued and slaughtered. The regulations provide also for the disinfection of a vessel that has carried diseased animals.

Importation of Plants, Bees, and Exotic Animals into South Africa.—The laws in force in the various States of the Union of South Africa relating to the importation of plants, bees, and exotic animals have been consolidated by the Government of the Union in the "Agricultural Pests Act, 1911," of which Sections 8 to 13 deal with the importation of plants, and Sections 21 to 23 with the importation of bees and exotic animals.

Plants may be introduced into the Union from oversea countries by post or through the ports of Cape Town, Durban, East London, and Port Elizabeth, or other place which may be prescribed as a port of entry by proclamation of the Governor-General.

The importation of eucalyptus, acacia, and coniferous plants, fresh grapes, and peach stones is prohibited. In the case of any other plants the importer must obtain a permit from the Department of Agriculture, which permit may limit the number of articles to be introduced thereunder to 10 rooted plants or 100 cuttings of one variety. No permit is, however, required for fruit, bulbs, tubers, vegetables, such portions of plants as cannot be propagated, and such herbaceous plants as may in the future be specified by the Minister of Agriculture. The following articles, in addition to requiring a permit, must be imported under the supervision of an officer of the Department of Agriculture, and under such precautions as the Department may in each case prescribe:—Grape vines and other plants of the family Vitaceæ; sugarcanes; plants cultivated for the production of rubber; tea plants and cotton seeds.

All plants, together with the materials in which they are packed, may be examined by an officer of the Department of Agriculture, for the purpose of discovering whether any insect pest or plant disease is present. This officer may order disinfection or other such treatment as is prescribed by the Department, the costs of such treatment being chargeable to the consignee, and in certain cases also the destruction of the plants affected. The consignee may be asked to furnish par-

ticulars of any parcel of plants imported, as to name and address of consignor, number and kind of the packages, names, quantities, varieties, and grade marks of the plants and place of origin of each of such plants.

The importation of bees, their larvæ, or eggs, and used apiaries and apiary appliances is prohibited, and the Governor-General is empowered to prohibit the introduction into the Union of any kind of exotic animal.

Importation into Sweden of Animal Products from Countries Infected with Foot-and-Mouth Disease.—A decree of June 22nd, 1911, prohibits the importation into Sweden of the following animal products from countries infected with Foot-and-Mouth Disease:—Unmelted tallow, unmelted fat, snouts, blood and fresh bones, used implements, hay and straw, entrails, hair, bristles, wool, horns, hoofs, and unprepared hides and skins.

Wool which has been washed and combed may, however, be imported if accompanied by the certificate of a Swedish Consul or other public authority at the port of shipment to the effect that the wool has been so treated; and the importation of entrails, hair, bristles, wool, horns, hoofs, and unprepared hides and skins is permitted through certain ports, if they have been factory cleaned, scraped, washed, dried, and salted, as the case may be. They may also be disinfected at the port of entry.

The full text of the decree can be seen at the Offices of the Board, 8, Whitehall Place, S.W.

Duty-free Admission of Machinery and Fertilisers into Turkey.—A decision of the Turkish Ministry of Finance towards the end of 1910

Demand for Agricultural Machinery Abroad.

allowing agricultural machinery and implements to be admitted into Turkey free of duty until August 14th, 1911, has now been followed by a law, dated June 5th, 1911, under which these articles will continue to be admitted duty-free. The new law also exempts chemical fertilisers from duty. The law does not limit the period during which these concessions are to remain in force. (*Board of Trade Journal*, September 21st, 1911.)

Agricultural Machinery in Manchuria.—The British Acting Commercial Attaché at Peking (Mr. H. H. Fox) states that according to information received from the engineer of the Manchurian Government, American manufacturers are endeavouring to introduce their agricultural machinery into Manchuria, and are offering to sell steam ploughs, reapers, &c., on long credit terms.

The objections commonly urged against the employment of agricultural machinery in China proper, viz.:—the small size of the farms and fields, the lack of capital among the peasant proprietors, and the extreme cheapness of agricultural labour—do not apply with equal force to Manchuria, where farming operations are conducted on a large scale and labour has to be imported and is not always available in sufficient quantity. (*Board of Trade Journal*, September 21st, 1911.)

Agricultural Machinery in Siberia.—The following information is from the report by the British Vice-Consul at Omsk (Mr. S. Randrup) on the trade of that district in 1910.

The imports into Siberia of harvesting machinery and agricultural implements—mowers and rakes, reapers and binders—are chiefly of American make, with some Canadian and Swedish; the demand for these increases yearly, owing to the large number of immigrants into Siberia.

The ploughs sold in Siberia are chiefly imported from Russia, but a number are also made in Siberia especially for use there. German ploughs are also on the market, but the home article is well able to compete with them both as regards quality and price, and it is believed that the importation of foreign ploughs will gradually decrease.

Portable engines with threshers are chiefly of British and German make, but the demand for them for the last two years has not been large, owing to crop failures. Some Russian-made portable engines are also being sold, but the turnover in this sort of engine is not a large one.

Agricultural Societies in Poland.—The following information is from the report by H.M. Consul at Warsaw (Mr. C. Clive Bayley) on the trade of Poland and Grodno in 1910:—

Notes on Agriculture Abroad. In 1898 the Russian Government promulgated a law for the establishment of agricultural societies, and, taking advantage of the opportunity thus offered, societies were formed in each of the ten governments of Poland. At the commencement of 1910 there were some twenty of these societies, with a membership of 2,497, and a capital of £55,000. This capital is the accumulation of the members' subscriptions—in most cases £10 10s.—to which sum the liability of each member is limited. The area worked by each society varies from a government to a district, except in the case of the Warsaw society, which operates in all ten governments, and which has increased its members' subscriptions and liability to £105 each.

The object of these societies is to purchase for and sell to farmers and peasants agricultural machinery, manures, and other requisites.

The capital, turnover, and profits of the various agricultural societies of Poland and Grodno, as extracted from their balance sheets for 1910, may be seen from the following table:—

Government.	Share Capital.	Sale of—			Total.
		Manures.	Agricultural Machinery.	Other Products.	
	£	£	£	£	£
Warsaw	12,400	113,900	30,800	43,200	187,900
Siedlce... ..	7,700	41,300	16,700	34,300	92,300
Lomza	2,700	9,000	3,600	11,800	24,400
Ciechanow	800	7,600	3,800	4,200	15,600
Piotrkoff	4,000	24,500	5,800	10,600	41,000
Kalisz	7,000	54,700	8,000	5,300	68,000
Kielce	3,800	28,100	15,100	15,800	59,000
Radom... ..	4,400	18,400	8,700	13,500	40,500

An account of the activity of these associations in Russia generally was given in this *Journal* for November, 1910, p. 680.

Agricultural Co-operation in Germany.—The following account of the growth and present position of agricultural co-operative societies in Germany is given in the Report of H.M. Consul-General, Sir Francis Oppenheimer, on the trade and industries of Germany in 1910 (*F.O. Reports, Annual Series, No. 4773.*)

The co-operative society movement was in Germany originally an almost exclusively industrial one, and limited to the towns. Separate agricultural organisations did not exist, and in so far as agriculturists resorted to co-operative organisation for satisfying their need for credit they joined the societies in the towns. These had been well received, and spread rapidly under the energetic leadership of Dr. Schultze, of Delitzsch. The scheme adopted was, broadly speaking, the British co-operative system. Not till the 'sixties of the last century were the first beginnings of a purely agricultural co-operative system evolved, the object of which was not only the granting of credit, but also the purchase of goods. This movement assumed larger proportions only from about 1890 onwards, and then developed with exceptional rapidity. It was the period in which German agriculture commenced a more energetic political activity generally and when agricultural interests became prominent in all questions. According to expert estimates there existed at the end of 1908 about 16,500 loan associations with 2,300,000 members. The number of produce or trading societies at the same time was 4,829, with 476,259 members; the number of the distributive (store) was 2,110, with 1,131,453 members. The number of the building societies was 800, with 150,000 members. The total membership of these societies was estimated at 4,400,000.

As far as the purely agricultural societies are concerned, the following table shows the growth in their numbers:—

	1890.	1900.	1910.
Agricultural Loan Associations	1,729	9,763	15,517
Co-operative Trading Associations	537	1,115	2,280
Dairy Produce Associations... ..	639	1,917	3,333
Other Associations	101	841	2,715
Total of purely Agricultural Co-operative Societies	3,006	13,636	23,845

It follows that the agricultural societies have experienced their greatest increase in the current century. The number of their members is estimated at 2,000,000, and to every 2,600 inhabitants of the German Empire there is one agricultural society. The concentration of German agriculture into societies, therefore, by far exceeds the same tendency in the United Kingdom. The societies among themselves are again grouped in federations, among which the Imperial Union of Agricultural Societies is the largest. On June 1st, 1910, the most prominent among the members of this Imperial Union were the credit societies with 12,894 societies, of which 12,161 societies, with a mem-

bership of 1,111,174, have issued detailed reports for the year 1908. According to these reports they held £1,048,880 in share capital; reserves, £2,184,850; £66,915,880 savings; and £9,421,930 liabilities on current account. On the other hand, they had outstanding in advances on current account £20,570,945 and £48,375,830 loans for fixed periods. The total advances granted in 1908 amounted to £36,998,300; 10,402 societies showed a profit of £359,320, but 1,193 had a loss of £68,775.

Other central federations worth mentioning are the Baden Federation with 399 loan funds, the Württemberg Federation with 1,115, the Trier (Treves) Federation with 334, and the Union of Farmers with 57. These credit societies have proved extremely useful to agriculture; it has been said of them that they take the place of the village banker, as they entirely adapt themselves to the requirements of agriculture; they are easily reached, they work cheaply, grant loans at a low rate of interest, and offer a safe deposit for savings. They educate the rural landowner to a systematic economy. The interest demanded by these societies varies in different parts of Germany. In contrast to the town societies they often make advances for longer periods; thus the Raiffeisen organisations had in 1908 granted 21 per cent. of their advances for periods up to one year, but no less than 65 per cent. for periods of from one to ten years.

Besides the credit societies there are in Germany agricultural co-operative societies for building, colonising, distilling, steam threshing, steam ploughing, buying and selling, for the sale of grain, the purchase of coal, the erection of silos, the sale of milk, of dairy produce, and of the produce of mills, for horse breeding, slaughtering, sale of alcohol, sale of tobacco, sale of cattle, letting of pasture land, societies of vintners, of brick-kiln owners, &c. In the case of the Raiffeisen organisations, the credit societies are also obliged to furnish their members with manure and fodder. In 1908 this purchase amounted to £3,936,770 for 7,251 societies.

While the associations were originally founded exclusively on the principle of self-help, the practice has now been adopted of also placing State aid at their disposal. In 1895 the Prussian Central Co-operative State Bank (*Zentral Genossenschafts Kasse*) was founded for this purpose with a capital of £250,000, since raised to £3,750,000. This bank—for short called *Preussenkasse*—which has been capitalised with State money, grants the Central Co-operative Federations cheap advances. The amount of these advances is regulated according to the total members' liability, deducting a *pro rata* sum as a safeguard. One of the conditions imposed on the associations by the *Preussenkasse* is that if they take advantage of its cheap loans they must deal exclusively with the *Preussenkasse*. At the end of 1909 the total loans made by this Central Bank to thirty-three Agricultural Co-operative Federations amounted to £4,341,227.

The importance of the agricultural co-operative association system in Germany can be finally illustrated by certain figures. The purchase by the associations of kainit in 1908 amounted to 580,000 tons, from which sales they received a discount of £17,500. The total purchase of salts for manure was more than 400,000 tons. In the Imperial Federation the total turnover amounted to £295,550,000. The assets were £16,700,000. The working capital amounted to £16,590,000, of which

£14,825,000 were held on loan. The total liability of the individual Central Federations amounted to £13,180,000, *i.e.*, 89 per cent. of the borrowed capital. The costs of administration amounted to £43,643. The combined purchase of goods reached a value of £9,350,000. The associations purchased, *e.g.*, coal for £900,000. The value of manure sold was £2,500,000; of fodder, £2,435,000. The value of grain and potatoes sold amounted to £2,935,000.

Legislation as to Agricultural Produce in Denmark.—The Danish Parliament have recently passed an Act, dated April 12th, 1911, which amends the law as to the trade in butter and foreign agricultural produce.

Under this Act the colouring of Danish butter by means of aniline dyes is prohibited, and no butter must be sold or imported which contains preservatives other than common salt or more than 20 per cent. of water. The sale or importation of butter containing more than 16 per cent. and less than 20 per cent. of water is also forbidden except on the condition that the article is specially marked.

The limit of water in butter exported from Denmark is fixed at 16 per cent., and the butter must have been produced from pasteurised cream or milk in a dairy accepted for control.

The prescribed brand (the Lurbrand) will in future be confined to butter produced in dairies accepted for control, and must not be used for other goods, and various provisions are made to prevent the misuse of the brand. The use of the Lurbrand is compulsory in the case of butter produced under the control, except in certain circumstances specified in the Act, and the brand must be placed both on the packages and directly on the butter itself. Butter for export **packed in** hermetically-sealed receptacles is exempt from the provisions as to marking with the Lurbrand, but such butter must be specially marked to show that it is Danish produce. Further regulations as to the Lurbrand may be made by the Minister of Agriculture, who is also empowered, if requested by the Dairy and Commercial Trades' Organisations, to make regulations as to the preservation of purity and cleanliness in creameries and on premises where butter is offered for sale.

The Act also lays down the conditions on which manufacturers of butter from pasteurised cream or milk are accepted for control, and under which the control is regulated. Dairies accepted for control are subject to inspection, and may be deprived of their right to use the Lurbrand if the prescribed conditions are not observed.

Imported Icelandic, Danish West Indian, or foreign agricultural produce (including butter, eggs, lard, tallow, honey, and meat, slaughter-offal, hermetically-packed goods, sausages, and other comestibles prepared from horses, cattle, sheep, goats, swine, and poultry) must be marked with distinct marks or indications of origin, whether sold wholesale or retail, or exported, and the goods must not be marked in such a way as to suggest that they are of Danish origin. Shops or stores where such goods are kept must display a distinct notice to this effect, and blends of Danish and foreign lard must not be sold or exported unless they are marked as directed by the Minister of Agriculture to indicate that they are blends. Lurbrand butter, also, if offered for sale within Denmark, must be conspicuously marked as such, and must be kept in the original package.

Imported fresh meat must, in addition, be marked as prescribed by the Minister of Agriculture, and in the event of the export regulations of the country from which any of the articles above-mentioned come not being satisfactory, the Minister of Agriculture may forbid their importation or cause them to be submitted to examination.

Live Stock in Mexico.—According to reports from American Consuls at Vera Cruz and Monterey, there are good opportunities for breeders to develop the sale of pure-bred male animals among Mexican farmers.

Bulls of pure blood are imported for improving the native stock. On one ranch where Herefords have been bred for many years there has been developed what is practically a breed of Mexican Herefords. These are free from those diseases which usually affect imported stock, while possessing all the good qualities of the imported animals.

A trade in young bulls or calves might be built up in the Vera Cruz district, for when brought in at an early age they become acclimatised readily. To do this the importer ought to have a ranch at an altitude of not less than 4,000 ft., where he could keep his stock and dispose of it as demand arose. A limited number of mature animals might be imported during the winter season for sale in the cooler parts of the district.

Agricultural Experiment Stations in Germany.—There are at the present time 72 agricultural experimental stations in Germany, with a staff comprising some 1,378 persons. Out of these stations 28 are supported by one or other of the German states, 6 by provincial authorities, 29 by chambers of agriculture, and 8 by associations, while one is private.

The receipts of these stations from various sources in 1909 were as follows (*Archiv des Deutschen Landwirtschaftsrats*, Berlin, 1911):—

	State.	Provincial Authorities.	Chambers of Agriculture.	Other Sources.	Total.
	£	£	£	£	£
Prussia	35,117	3,827	18,933	145,458	203,335
Bavaria	12,574	1,506	524	13,839	28,443
Saxony	4,495	325	45	3,404	8,269
Wurtemberg	2,322	—	—	3,048	5,370
Baden	2,567	—	—	745	3,312
Hesse	1,300	—	—	2,550	3,850
Mecklenburg-Schwerin	1,361	—	526	4,074	5,961
Saxe-Weimar	302	—	—	1,450	1,752
Oldenburg	210	—	125	2,227	2,562
Anhalt	1,109	—	1,355	577	3,041
Hamburg	395	—	—	4,265	4,660
Alsace-Lorraine ...	2,318	—	137	2,071	4,526
Imperial Institute ...	14,610	—	—	—	14,610
Total	78,680	5,658	21,645	183,708	289,691

Possibility of an Export of British Pedigree Cattle to Brazil.—A report from H.M. Acting-Consul-General at Rio de Janeiro (Mr. Ernest Hambloch) discusses the possibility of an export of British pedigree

cattle to Brazil. H.M. Consul states that the present moment seems propitious for British breeders to turn their attention to this market.

The question is now being raised as to whether Brazil cannot begin to compete with the River Plate in the exportation of cattle and meat, and H.M. Consul is of opinion that, as the European markets require heavy cattle, the native breed, which is small, must first be improved.

The existing Brazilian race of cattle has been in-bred for so long and from small and somewhat poor cattle, that it is only natural that the breed should deteriorate. The question of importing European stock has, as yet, not received much attention, and the efforts made by the late President to encourage the importation of breeding cattle into the State of Minas Geraes have not been sufficiently well followed up during recent years by the Government of that State. The Government of the State of San Paulo is, however, now beginning to take up the question seriously, and this may stimulate the State of Minas Geraes to fresh efforts to establish an industry for which it is admirably adapted.

During the *first* week (Oct. 1st to Oct. 7th) fair dry conditions were experienced at times in all districts, but they were less frequent in the

**Notes
on the Weather
in October.**

east and south of Great Britain than in the west and north-west. Temperature was below the average everywhere, especially in England S.E., and there was generally a large deficiency in rainfall. Although largely in excess in Scotland W. and England N.W., bright sunshine did not, on the whole, differ much from the normal.

The general condition was again fair and dry in the *second* week, but a good deal of mist and fog prevailed in the middle and later part of the week, and rain was experienced at times in nearly all districts. No rainfall, however, was recorded during the week in Scotland W. and England N.W., and the falls in the other districts of Scotland and in several districts of England were very light. There was general improvement in the amount of bright sunshine recorded compared with the previous week.

The weather in the *third* week was at first generally fair, but afterwards became unsettled, with occasional rain in all districts. A good deal of mist or fog was experienced in England about the middle of the week. "Very unusual" warmth was recorded over the whole of England and in parts of Scotland, the excess of temperature above the normal being as much as 6° in some English districts. Rainfall generally was either "moderate" or "light," but was slightly above the average in England S.E. and Scotland W. Bright sunshine dropped again to below the normal in all districts.

Snow and sleet occurred in Scotland in the *fourth* week, and the weather generally was in a very unstable condition. Rainfall over England was considerably in excess of the normal. Temperature was below the average in Scotland and the northern districts of England, but above it elsewhere.

The weather experienced during the thirteen weeks ended September, 1911 (roughly corresponding to the period of summer) has been in marked contrast to the average conditions during this period in the last

thirty years, 1881-1910. On the average in this period during the last thirty years 480 hours of sunshine were experienced, whereas in 1911 660 hours were recorded on the average over the United Kingdom. There were only thirty-five days in the summer of 1911 on which rain was experienced, as compared with an average of forty-eight rain days during the thirty years, and the corresponding rainfalls were 5'5 ins. and 8'6 ins. The average temperature of the summer of 1911 was 60'4°, compared with an average summer temperature from 1881-1910 of 57'4°.

The Board of Agriculture and Fisheries have issued the following preliminary statement, dated Oct. 12th, showing the estimated total production of hops in the years 1911 and 1910, with the acreage and estimated average yield per statute acre in each county of England in which hops were grown.

Counties, &c.		Estimated Total Produce.		Acreage Returned on 5th June.		Estimated Average Yield per Acre.	
		1911.	1910.	1911.	1910.	1911.	1910.
Kent ...	East	Cwts. 61,606	Cwts. 49,135	Acres. 5,718	Acres. 5,779	Cwts. 10'77	Cwts. 8'50
	Mid	79,101	64,874	6,966	6,942	11'36	9'34
	Weald... ..	86,032	72,886	7,507	7,357	11'46	9'91
	Total Kent	226,739	186,895	20,191	20,078	11'23	9'31
Hants		14,627	16,946	1,444	1,411	10'13	12'01
Hereford		29,256	40,961	5,034	4,987	5'81	8'21
Surrey		4,269	5,341	500	514	8'54	10'38
Sussex		29,847	22,878	2,698	2,653	1'06	8'62
Worcester		22,630	28,666	3,061	3,109	7'39	9'22
Other Counties*		655	988	128	134	5'12	7'37
Total		328,023	302,675	33,056	32,886	9'92	9'20

* Gloucester and Salop.

NOTE.—The estimated average yield per acre this year exceeds by one cwt. the average yield per acre of the previous ten years, and is three-quarters of a cwt. larger than in 1910. The increased yield per acre on a slightly increased acreage results in a total crop which exceeds that of last year by 25,000 cwts. This year's crop of 328,000 cwts., although larger than that of 1910, and still larger than that of 1909, is less than that of 1908 by 143,000 cwts. It is also 69,000 cwts. below the average total crop of the decade of 1901-10, the reduction of acreage having more than counterbalanced the increased yield per acre.

The following preliminary statement shows the estimated total produce and yield per acre of the corn, pulse, and hay crops in Great

Produce of Corn, Britain in the year 1911, with comparisons for
Pulse and Hay 1910, and the average yield per acre of the
Crops. ten years 1901-1910:—

Crops.		Estimated Total Produce.		Acreage.		Average Estimated Yield per Acre.		Average of the Ten Years 1901-1910.
		1911.	1910.	1911.	1910.	1911.	1910.	
WHEAT		Qrs.	Qrs.	Acres.	Acres.	Bshls.	Bshls.	Bushels.
	England . . .	7,359,142	6,478,839	1,804,045	1,716,629	32'63	30'19	31'65
	Wales . . .	135,430	135,986	38,487	39,428	28'15	27'59	26'82
	Scotland . . .	337,624	244,831	63,511	52,797	42'53	37'10	39'30
	Great Britain.	7,832,196	6,859,656	1,906,043	1,808,854	32'87	30'34	31'73
BARLEY								
	England . . .	5,256,546	5,910,892	1,337,431	1,449,492	31'44	32'62	33'31
	Wales . . .	330,678	350,964	86,800	87,569	30'48	32'06	31'16
	Scotland . . .	786,423	797,157	173,634	191,620	36'23	33'28	35'65
	Great Britain.	6,373,647	7,059,013	1,597,865	1,728,681	31'91	32'67	33'47
OATS								
	England . . .	8,981,803	9,721,800	1,841,136	1,857,731	39'03	41'87	42'07
	Wales . . .	858,792	971,683	206,037	205,093	33'35	37'00	35'04
	Scotland . . .	4,453,441	4,535,142	963,476	953,150	36'98	37'87	37'35
	Great Britain.	14,294,036	15,228,625	3,010,649	3,020,974	37'98	40'33	40'14
BEANS								
	England . . .	917,591	1,032,377	294,059	256,528	24'96	32'20	30'05
	Wales . . .	3,456	4,896	1,134	1,363	24'38	28'74	26'86
	Scotland . . .	39,092	46,447	9,464	9,493	33'04	39'14	35'74
	Great Britain.	960,139	1,083,720	304,657	267,384	25'21	32'42	30'26
PEAS								
	England . . .	458,975	496,588	139,150	151,823	26'39	26'17	27'27
	Wales . . .	1,641	1,946	561	660	23'40	23'59	21'79
	Scotland . . .	1,535	2,114	473	566	25'96	29'88	27'55
	Great Britain.	462,151	500,648	140,184	153,049	26'37	26'17	27'24
HAY from Clover, Sainfoin, &c.		Tons.	Tons.			Cwts.	Cwts.	Cwts.
	England . . .	1,774,464	2,360,419	1,465,383	1,485,573	24'22	31'78	30'15
	Wales . . .	185,658	234,755	172,049	169,939	21'58	27'63	25'04
	Scotland . . .	652,470	669,164	437,333	419,067	29'84	31'94	32'25
	Great Britain.	2,612,532	3,264,338	2,074,765	2,074,579	25'18	31'47	30'12
HAY from Permanent Grass.								
	England . . .	3,898,205	5,441,735	4,283,629	4,295,832	18'20	25'33	24'15
	Wales . . .	446,227	584,968	547,194	545,109	16'31	21'46	19'64
	Scotland . . .	226,276	225,589	171,434	163,503	26'40	27'59	29'26
	Great Britain.	4,570,708	6,252,292	5,002,257	5,004,444	18'27	24'99	23'83

NOTE.—The *Wheat* crop of 1911, amounting to 7,832,196 quarters, is the largest returned since 1899, and exceeds by nearly one million quarters the crop of last year. The yield per acre was $1\frac{1}{2}$ bushels ($3\frac{1}{2}$ per cent.) above the average of the preceding ten years, and $2\frac{1}{2}$ bushels more than in 1910, though smaller than in 1909 by nearly 1 bushel per acre. Each of the other crops is more or less below average. The yield of *Barley* was $1\frac{1}{2}$ bushels per acre below average, and the total crop is more than a million quarters less than the average, and smaller than in any previous year on record. *Oats* were over 2 bushels per acre short of an average, and the total crop is less than

in any year since 1901. *Beans* were 5 bushels per acre below average, and notwithstanding a substantially increased acreage, gave a total crop of 120,000 quarters less than in 1910. The yield of *Peas* was slightly better than in 1910, but nearly a bushel per acre below average. *Clover* and "*Seeds*" *Hay* yielded 5 cwt. per acre, or 16 per cent., below average, while *Meadow Hay* gave little more than three-fourths of an average. The total crop of *Clover* and "*Seeds*" *Hay* is the smallest since 1893, and of *Meadow Hay* the smallest since 1901. Altogether, the *Hay* crop of 1911, amounting to 7,183,240 tons, is 2,333,000 tons less than that of 1910, and about 20 per cent. below the ten years' average.

The Crop Reporters of the Board, in reporting on the state of the crops and the agricultural conditions on November 1st, speak unani-

**Crop Conditions
in Great Britain
on November 1st.**

mously of the unusually excellent quality and condition of both wheat and barley when harvested, although here and there barley is rather steely and the grain is sometimes small. Oats are not so universally satisfactory, although quality and condition are generally very good. The yield of wheat was also good, as shown by the recently published preliminary returns, the total, on an area of 1,906,043 acres, amounting to 7,832,196 quarters, or 32'87 bushels per acre. 1,597,865 acres of barley yielded 6,373,647 quarters (31'91 bushels per acre, or 1½ bushels below average); while the oat harvest was distinctly poor, 3,010,649 acres yielding only 37'98 bushels per acre (more than 2 below average), or 14,294,036 quarters altogether. Relatively better results were secured in Scotland than in England.

Beans yielded only 25'21 bushels per acre, almost 5 bushels below average, and notwithstanding a substantially increased acreage gave a total crop of only 960,139 qr., or 120,000 qr. less than in 1910. Peas were not so seriously deficient, the total being 462,151 qr., or 26'37 bush. per acre, which is less than 1 bush. below the average.

Good progress has been made with potato lifting, which is practically, or very nearly, finished throughout Great Britain. The potatoes are not large, but are generally of good quality, except where second growth has occurred; there is a considerable amount of this, but unusually little potato disease.

Mangolds have very generally been lifted in good condition, though the roots are mostly small. Turnips and swedes are almost everywhere a bad crop and much mildewed, some areas being entirely lost. In Scotland, however, and in the northern districts of England, the October rains had effected some improvement, and several reports state that these roots were still growing at the end of the month.

Excellent progress has, except on certain heavy lands, been made with autumn cultivation, the October rains having generally been adequate for the purpose, although here and there it is stated that they have been so much as to delay the work of sowing, and, rather more frequently, that they have not been sufficient to render the heavier lands workable, especially in the east of England. Large breadths of corn have been sown; indeed, in many places the winter wheat is nearly all in the ground, and the young crop is everywhere looking very well.

Seeds are generally very thin and patchy; in isolated instances a thick growth is mentioned, but this is decidedly exceptional. Many acres have been resown or ploughed up. Recent rains have effected considerable improvement.

Live stock are still reported, generally, to be in poor condition, and they seem to have made little progress during the month. Many reports state that fewer cattle are being fattened for market this season, largely on account of the anticipated shortage of keep during the winter, hay, straw, and roots all being deficient. The official returns of the hay crop show that clover and rotation grasses have yielded only 25·18 cwt. per acre throughout Great Britain as a whole, or $\frac{1}{4}$ ton below the average, while the deficiency in hay from permanent grass is over 5½ cwt., the yield per acre being only 18·27 cwt. Here also the Scottish returns are not so low as the English, being only 2½ to 3 cwt. below the average. The total production of hay in Great Britain from both seeds and meadow amounts to 7,183,240 tons, which is 2,333,000 tons less than that of 1910, and about 20 per cent. below the average of the last ten years.

The *Bulletin of Agricultural Statistics* for October, 1911, issued by the International Institute of Agriculture, shows the production of the

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Abroad.**

cereal crops this year from information received up to October 20th. The countries for which it is possible to give an approximate estimate of the production are as follows:—In Europe:

Prussia, Belgium, Denmark, Spain, France, Great Britain, Ireland, Hungary (including Croatia and Slavonia), Italy, Luxemburg, Netherlands, Roumania, Russia in Europe (63 governments), Switzerland; in America: Canada and United States; in Asia: India, Japan, Russia in Asia (10 governments); in Africa: Algeria (Departments of Alger and Oran), Egypt, Tunis.

The principal additions which have been made to the tables are the figures for barley and oats in France, and for wheat and barley in Egypt, the latter country being included in the tables for the first time. The data for Canada have undergone important changes in accordance with the results of the recent census, and are referred to below.

Wheat.—The production of wheat in Canada is now estimated to be 108,718,000 cwt., a reduction of 877,000 cwt. on the previous estimate. The total production for all the countries included this month is 1,648,449,000 cwt., as compared with 1,642,968,000 cwt. in 1910, or an excess of 0·3 per cent.; while the total area exceeds that of last year by 3·3 per cent.

Rye.—The total production of rye in all the countries specified (excluding Great Britain, India, Japan, Algeria, Egypt, and Tunis) is 683,412,000 cwt., as compared with 708,657,000 cwt. last year, or a decrease of 3·6 per cent. The area planted is greater than that of 1910 by 2 per cent.

Barley.—The revised figures for Canada now place the yield as 18,671,000 cwt., a reduction of 3,419,000 cwt. on the preceding estimate. The total production in all the countries named above, with the exception of India, is estimated to be 506,717,000 cwt., as against 509,827,000 cwt.

last year, or a decline of 0·6 per cent. The area planted nearly equals that of 1910.

Oats.—The revised figures for Canada place the yield for this cereal at 105,848,000 cwt., a reduction of 5,881,000 cwt. on the former estimate. The total production in all the countries named above (excluding India and Egypt) is 965,199,000 cwt., as compared with 1,064,278,000 cwt. last year, or a decline of 9·3 per cent. The area planted is very little below that of 1910.

The following supplementary notes are given:—

Russia.—In addition to the preliminary figures of the harvest of 1911 included in the general totals, the Institute has received from the General Direction of Agriculture preliminary figures for the probable yield of the more important cereal crops in Russia in Europe (including Ciscaucasia). These estimates have been calculated, for winter cereals, from the results of trial threshings, and for spring cereals from the number of sheaves harvested per deciatine, or from the general aspect of the crops. The figures are:—Winter wheat, 97,348,000 cwt.; spring wheat, 147,601,000 cwt.; total wheat, 244,949,000 cwt. Winter rye, 372,920,000 cwt.; barley, 176,677,000 cwt.; oats, 235,472,000 cwt.

Chile.—The areas sown to wheat and barley during the autumn of 1911 are 1,852,000 acres and 370,000 acres respectively. The condition of each of these crops on October 1st promises a yield 20 per cent. above the average. Weather conditions are favourable, and the germination and development of spring cereals are good.

Australia.—The area sown to wheat in 1911 is 7,862,000 acres, being an increase of 12 per cent. over the area sown in 1910. The condition of the crop on October 1st was average.

New Zealand.—The condition of winter wheat, barley, and oats on October 1st was average.

Sweden.—The German Consul-General in Stockholm reports on October 23rd that the Swedish Agricultural Department estimates the condition of the crops as follows:—Winter wheat, 3·6; winter rye, 3·4; barley, 3·5; oats, 3·1; potatoes, 2·7; sugar beet, 2·7 (5=very good; 4=good; 3=average; 2=poor; 1=very poor). (*Deutscher Reichsanzeiger*, October 31st, 1911.)

United States.—The Crop Reporting Board of the Department of Agriculture reports that the preliminary returns of the production of maize in 1911 indicate a total yield of about 2,776,301,000 bush., or an average of 23·9 bush. per acre, as compared with 27·4 bush. per acre in 1910, and a ten-year average of 26·0 bush. The general average as to quality is 80·6 per cent., as compared with 87·2 last year, 84·2 in 1909, and 86·9 in 1908. The preliminary estimate of the average yield of potatoes is 80·6 bush., against an average yield of 93·4 bush. in 1910. The indicated yield is given as 281,735,000 bush., against 328,787,000 bush. in 1910. (*Dornbusch*, November 8th, 1911.)

Sugar Beet in Prussia.—From a report received from the Foreign Office the estimated yield of sugar beet for the whole of Prussia at the beginning of October is 5,139,395 tons, or 5·94 tons per acre, as compared with 11·90 tons per acre in 1910.

Hops.—From reports received through the Foreign Office, it is

estimated that the yield of hops in *Baden* is 3,500 cwt.; *Bavaria*, 105,000 cwt.; *Wurtemberg*, 32,000 cwt.; *Prussia*, 6,500 cwt.; *Alsace Lorraine*, 58,000 cwt. The total production for *Germany* is 205,000 cwt., as against 398,300 cwt. in 1910. In the State of *New York*, the production is estimated to be from 25,000 to 27,000 bales, in *Oregon* 70,000 bales, in *California* 85,000 bales, in *Washington* 22,000 bales. Only a small proportion of this year's crop in *New York* is of choice quality, and on the Pacific coast the quality is mixed.

A report on the recent hop fair in *Warsaw* states that the total supplies, including a small quantity left over from last year, amounted to 304,000 lb., against 582,000 lb. in 1910. The total sales amounted to only 93,600 lb., as compared with 244,800 lb. last year, and prices ranged from about 32d. to 38d. per lb.

Potatoes on the Continent.—From reports received from the Foreign Office, in *France*, the production in the following Departments of the north is estimated to be as follows:—*Ardennes*, 40,250 tons; *Nord*, 78,750 tons; *Pas de Calais*, 82,000 tons; *Somme*, 62,500 tons; *Aisne*, 32,500 tons. It is thought that for the whole district there will be a deficit of about 100,000 tons for local consumption. In the Department of *Finistère* the season of 1911 has proved superior to that of 1910, and the late sorts are specially good, both as regards quality and crop. The estimated yield of potatoes for the whole of *Prussia* at the beginning of October is 23,377,000 tons, or 4'21 tons per acre, as compared with 5'76 in 1910. According to the latest estimates for *Germany*, the year's crop is anticipated to turn out considerably better than was generally expected, and the production may be taken to represent nearly three-quarters of an average harvest. In *Norway*, potatoes have nearly all been gathered in the east and south. The crop is better than was anticipated, but will fall considerably below the average in the east. In other districts the crop will be an average, or even over average, one. An especially good crop is expected around *Trondhjem*. In *Hungary* the total production of potatoes is 83,280,000 cwt. The condition of the crop in *Austria* at the middle of October is slightly below average.

The following statement shows that, according to the information in the possession of the Board on November 1st, 1911, certain disease of animals existed in the countries specified:—

Prevalence of Animal Diseases on the Continent.

Austria (week ending September 20th).

Anthrax, Blackleg, Foot-and-Mouth Disease (total of 110,565 Höfe now infected), Glanders and Farcy, Swine Fever, Swine Erysipelas, Sheep Scab.

Belgium (fifteen days ending September 30th).

Anthrax, Blackleg, Rabies, Sheep Scab, Foot-and-Mouth Disease (1,945 "foyers" in 442 "communes").

Bulgaria (week ending October 14th).

Glanders and Farcy, Rabies, Sheep-pox, Swine-fever.

Denmark (month of September).

Anthrax, Foot-and-Mouth Disease (4 cases).

France (month of September).

Blackleg, Glanders and Farcy, Rabies, Sheep-pox, Sheep-scab, Swine-fever, Swine Erysipelas, Foot-and-Mouth Disease (20,729 "étables" in 3,124 "communes").

Germany (on October 15th).

Glanders and Farcy, Swine-fever, Foot-and-Mouth Disease (34,463 infected places in 5,694 parishes).

Holland (month of September).

Anthrax, Foot-rot, Sheep-scab, Swine Erysipelas, Foot-and-Mouth Disease (13,477 outbreaks in 11 provinces).

Hungary (week ending September 13th).

Anthrax, Glanders and Farcy, Rabies, Swine Erysipelas, Swine-fever, Foot-and-Mouth Disease (total of 45,561 "cours" now infected).

Italy (week ending September 24th).

Anthrax, Glanders and Farcy, Swine Erysipelas, Swine-fever, Foot-and-Mouth Disease (350 new cases entailing 3,441 animals).

Montenegro (seventeen days ending June 16th).

Foot-and-Mouth Disease (329 "étables" infected in 17 "communes").

Norway (month of September).

Anthrax, Blackleg.

Roumania (nine days ending October 13th).

Dourine, Glanders and Farcy, Foot-and-Mouth Disease, Pleuro-pneumonia, Rabies, Sheep-pox, Swine Erysipelas, Swine-fever, Sheep-scab.

Russia (month of May).

Anthrax, Cattle-plague, Glanders and Farcy, Pleuro-pneumonia, Rabies, Sheep-pox, Swine Erysipelas, Swine-fever, Foot-and-Mouth Disease (233,160 cases in 2,847 "communes").

Servia (eight days ending October 7th).

Anthrax, Rabies, Sheep-pox, Swine-fever, Foot-and-Mouth Disease (414 animals newly infected in 10 "arrondissements").

Spain (month of August).

Anthrax, Blackleg, Dourine, Foot-and-Mouth Disease (18,642 animals), Glanders and Farcy, Pleuro-pneumonia, Rabies, Sheep-pox, Sheep-scab, Swine Erysipelas, Tuberculosis.

Sweden (month of September).

Anthrax, Blackleg, Swine-fever, Foot-and-Mouth Disease (3 farms).

Switzerland (week ending October 22nd).

Anthrax, Blackleg, Swine Erysipelas, Foot-and-Mouth Disease (126 "étables" and 4 "alpages-pâturages" entailing 1,057 animals, of which 45 "étables" were declared during the week).

Information respecting rates of wages agreed upon at the principal hiring fairs for farm servants held in Scotland in the first six months of 1911 has been received by the Board of Trade.

**Agricultural
Hirings in
Scotland.**

With the exception of the North-Eastern counties, the wages of men servants generally remained stationary. The rates, however, showed some tendency to harden, and in a number of cases good men who

remained in their former places gained slight advances. In the North-Eastern counties continued emigration, mainly to Canada, had caused further shortage in the supply of both men and women servants, and wages showed an upward movement. This was especially the case in the counties of Aberdeen, Banff, and Elgin, where in many cases men's wages were advanced 20s. for the half-year.

There was generally a good demand for women servants, and in the South-Eastern counties their wages showed an upward tendency. (*Board of Trade Labour Gazette*, October, 1911.)

The Board of Agriculture and Fisheries have been furnished by the Board of Trade with the following report, based on returns from correspondents in various districts, on the demand

Agricultural Labour for agricultural labour in October:—

in England

during October.

There was a fair demand on the whole for labourers outside the regular farm staff, principally for lifting potatoes, getting up roots, threshing, spreading manure, and trimming hedges. The demand was, however, considerably reduced in many districts on account of the partial failure of the root crops, and in a number of such districts there was a consequent surplus of men. Towards the end of the month rain was a further cause of loss of time to extra labourers, though not to any great extent.

Northern Counties.—Rain caused a little interruption to outdoor employment in the last week of October, but otherwise there was a fair demand for extra labourers in most districts for such work as potato-lifting, getting up the root crops, hedge-trimming, spreading manure, and threshing. The supply of extra men was reported as in excess of the demand in the Longtown (*Cumberland*) and Driffield and Wath (*Yorkshire*) Rural Districts.

Midland Counties.—The partial failure of the root crops reduced the demand for extra labourers in these counties, and there was a consequent surplus of men in a number of districts, including the Nantwich and Tarvin (*Cheshire*), Hayfield (*Derbyshire*), Leek and Tamworth (*Staffordshire*), Evesham (*Worcestershire*), Crowmarsh and Woodstock (*Oxfordshire*), Eton (*Buckinghamshire*), and Luton (*Bedfordshire*) Rural Districts. A scarcity of men for permanent situations was reported in the Bucklow (*Cheshire*), Pershore (*Worcestershire*), and the Banbury (*Oxfordshire*) Rural Districts.

Eastern Counties.—Employment was generally regular throughout the month in these counties, and there was a fairly good demand for extra labourers for such work as threshing, potato-lifting, hedge-trimming, and spreading manure. The partial failure of the root crops, however, accounted for a surplus of men in several districts in *Norfolk* and *Suffolk*.

Southern and South-Western Counties.—Outdoor work in these counties was a little interrupted by rain in the latter part of the month, and the employment of extra labourers was further reduced on account of the forward state of farm work and the poor root crops. An excess of such men was reported in the following Rural Districts: Guildford (*Surrey*), Westhampnett (*Sussex*), Fordingbridge and Havant

(*Hampshire*), Cricklade, Devizes, and Westbury (*Wiltshire*), Wellington (*Somerset*), and Cirencester and Winchcombe (*Gloucestershire*). There was a scarcity of men for permanent situations in the Godstone (*Surrey*), Chippenham (*Wiltshire*), Dursley, Gloucester, and Stow-on-the-Wold (*Gloucestershire*), and Truro (*Cornwall*) Rural Districts.

THE CORN MARKETS IN OCTOBER.

C. KAINS-JACKSON.

Unusual animation has marked the October exchanges, at which the offerings of British new crops have been much above the average. The quality being the finest known for many years, liberal deliveries have induced no decline in prices. The trade in imported grain, after showing remarkable steadiness, was on the last two days of the month against holders.

Wheat.—English wheat has averaged about half-a-crown per qr. more than in October, 1910, and the advance from September, 1911, has been sixpence to a shilling. The home product has remained far and away the cheapest sort of wheat in the market, 34s. to 36s. commanding 504 lb. of dry hard red wheat, and 36s. to 37s. the best white, sometimes 512 lb. to the quarter, while the inferior types of Indian have started at 35s. per 492 lb., and the best Canadian reached 41s. per qr. on the 16th, though parted with a fortnight later at ninepence under that price. The production of new crosses and varieties of wheat has been a feature of the month's markets, that is to say, the crops of such crosses and varieties have come on offer in sufficient bulk to admit of agricultural as distinguished from a scientific judgment on them. Great satisfaction has been expressed, and the enthusiasm of farmers over these new developments has taken the form of large purchases for sowing purposes. Shipments from the exporting countries were 704,000 qr. from North America (largely from Canada), 301,000 qr. from South America, 828,000 qr. from Russia, 1,030,000 qr. from Europe S.E., 261,000 qr. from India, and 438,000 qr. from Australasia. Russia has sent off an extremely small total as compared with the 3,942,000 qr. exported in October, 1910, but some think that this is a husbanding of resources by Russia, rather than an indication of greatly reduced crops. The quantity of wheat on passage is stable, and about an average.

Flour.—The credit and delivery price of Town households has hardly varied from 28s. per 280 lb. sack; the cash ex-mill price has been sometimes 26s., sometimes 26s. 6d. The top price has been motionless at 32s., and best makes of fine American wheat ground in the London mills have been very steady at 28s. 6d. A mixture of such makes with Town Households would cost 27s. 6d. per sack, and give very fair bread and a reasonably tall loaf. Country flour during part of the month was pressed on sale, but firmness was recovered before the close, prices being 25s. for straights and 24s. for roller whites. Stone-ground flour is by no means uniformly cheaper than roller-ground; the days when the stone mill was despised appear to have passed. Hungarian flour, after being maintained at 40s. to 41s. per sack, has come down to 39s., and at this price is in improved request. American flour on the last two days of the month was 1s. cheaper to buy forward, and spot prices were affected to the extent of sixpence. Quotations included 31s. for best spring

patents, 30s. for Pillsbury's Best, 28s. 6d. for 1st Minnesota, 28s. for best Kansas, and 26s. 3d. for secondary. Canadian flour closed at 29s. for best, 28s. for "fine export grade," and 26s. 6d. for secondary. There were some buyers of Australian flour at 25s. 6d., of fine Belgian at 31s. 6d., and of best French from the famous Corbeil mills at 32s. per sack. The shipments of flour from North America for October were 658,000 sks., a fair total, and some increase on the previous month.

Barley.—Maltsters and brewers recall few Octobers to compete with that under notice. The excellence of the new crop deliveries has been surprising, and while the champion samples have mostly come from Hampshire, Dorset, and the Upper Thames Valley, very fine barley, often weighing 454 lb. to the quarter, has been in evidence on the exchanges of the Severn and Wye valleys, of East Anglia, of Essex, and of East Kent. The price of the best samples has ranged from 40s. to 42s. per quarter. On the 30th at Mark Lane little was to be had under 34s., distillers being driven to buy other grain. The demand since harvest has been so fierce that fully three million quarters of the new crop are held to have been already disposed of. Imported barley has been quoted at 25s. to 26s. for Russian, Indian, Morocco, and Persian, but buyers do not care, as a rule, to go beyond six shillings per cental (24s. per 400 lb.) for the lighter feeding types. Some fine barley is to hand from Anatolia, and took the foreign championship in the Barley Exhibition at Islington. The price is 36s. to 40s.; the weight 448 lb. Central Europe has no fine barley to spare in any quantity, but "fancy" orders for small consignments are reported, 44s. to 45s. being paid. Californian barley, of which some 120,000 qr. are on passage, is quoted at 36s. to 37s. for fair average quality. Supplies on passage, all kinds, are 560,000 qr. October shipments were 50,000 qr. from California, 2,405,000 qr. from Russia, and 455,000 qr. from Europe S.E.

Oats.—Some extraordinary samples of the new home crop have reached the markets. On the 7th a sample weighing 49 lb. to the bushel was shown at Dorchester, and some 47 lb. lots have reached Mark Lane. Unlike wheat and barley, however, which are conspicuous for good colour, much of the oat crop appears to be unsatisfactory in that respect. Prices have been a full guinea per 336 lb. at the leading markets, with Gartons and other named varieties commanding a florin more. There has been an excellent seeding demand for winter oats. Imported 304 lb. descriptions have gone but slowly into consumption, but they are nearer to the six shillings per cental feeding level than is grinding barley. The shipments of oats for October were 90,000 qr. from Canada, 147,000 qr. from Argentina, 726,000 qr. from Russia, and 428,000 qr. from Europe S.E. The month closed with 350,000 qr. on passage.

Maize.—Most purchasers consider maize at 28s. 9d. per quarter (six shillings per cental) rather dear; they expect it to be perhaps 3d. per cental under feeding barley and light oats. When, therefore it rises to 6s. 3d. per cental (London), 6s. 5d. (Liverpool), and 6s. 6d. to 6s. 9d. at many of the inland markets, demand is sharply cut down. A very small importation, less than half an average, has marked the month, but the inquiry has ebbed to about the same extent, and values at the close were not much in either buyers' or sellers' favour. American crop results are awaited with some interest; the crop has been secured in fair

weather, but is not expected to be a large one. The area sown in Argentina shows an increase, but that country's harvest of maize seldom invades England before June. Maize shipments for October were 408,000 qr. from the U.S., 190,000 qr. from Russia, and 162,000 qr. from Europe S.E. Only 160,000 qr. are on passage.

Oilseeds.—Russian and Indian linseed has been on offer at about 17s. 6d. per cental, and Argentine at about 17s. 3d., but these are high prices, and check demand. Sunflowerseed at 15s. per cental for best, 14s. for ordinary, comes out well on comparative analysis with linseed, and is recommended by admitted experts. Sunflowerseed cake is now in large and regular use in Denmark and Holland. London-made linseed cake at £9 7s. 6d. per ton is 7s. 6d. dearer than a year ago; decorticated cottonseed cake at £8 is about ten shillings dearer.

Various.—English beans, peas, and tares as sent to recent markets have been of very fine quality, and often of quite remarkable weight. Resulting demand has been good, and prices have advanced. Supply of beans is restricted, as the use of them on the farm is larger than usual. Some good New Zealand beans make 37s. owing to scarcity and good intrinsic value. Good maple peas at 38s., and good dun at 35s., have been an active trade. Rye has risen to 32s. per qr. The dearth of bran, middlings, and pollard has continued during the month, but there were signs at Mark Lane on the 30th of willingness to deliver in November at 2s. 6d. to 5s. per ton under previous currencies. Barley-meal has been making £7 10s. to £8 per ton.

THE LIVE AND DEAD MEAT TRADE IN OCTOBER.

A. T. MATTHEWS.

Fat Cattle.—Although the long drought may be said to have come to an end in October, and the rains, though still light, were sufficient to give a good colour to the pastures, the season was too advanced for abundant growth or for the change of weather to have much effect on the condition of the cattle coming to market. Instead of any improvement, the marked deficiency in flesh that has been the leading feature since July was aggravated in October, and the proportion of animals with any claim to rank as first quality was very small. This happens every year towards the close of the grazing season in some degree, but the low average condition of the supplies has been quite abnormal during the last three months. The following quotations of average prices show a wider difference than usual between first and second quality cattle, a difference that has increased during the last month. In about twenty leading English markets Shorthorns averaged 8s. 3d., 7s. 3½d., and 6s. 2½d., against 8s. 3d., 7s. 5d., and 6s. 4½d. in September; Herefords, 8s. 5½d. and 7s. 9½d., against 8s. 5½d. and 7s. 9d.; Devons, 8s. 5½d. and 7s. 5½d., against 8s. 3½d. and 7s. 6d.; Welsh Runts, 8s. 1½d. and 7s. 3½d., against 8s. 1½d. and 7s. 5d.; and Polled Scots, 8s. 5½d. and 7s. 8½d., against 8s. 4½d. and 7s. 9d. per stone.

Veal Calves.—Fat calves have met with a rather weaker demand, and the proportion of good quality was very small. The average price, taking all British markets, was 8d. per lb. for first, and 7d. for second quality, or about ½d. per lb. below the September averages.

Fat Sheep.—There was great dullness in the sheep trade, and prices remained on a dead-level throughout the month. There were the usual local fluctuations of about $\frac{1}{4}d.$ per lb., according to supplies, but the average prices for the whole of England never varied at all, and were also almost exactly the same as in September. In about nineteen English markets, Downs again averaged $7\frac{1}{2}d.$, $6\frac{1}{2}d.$, and $5d.$ per lb. for the three qualities, and Longwools, $6\frac{3}{4}d.$, $6d.$, and $4\frac{3}{4}d.$ The best Cheviots in English markets averaged about the same as the Downs, and Scotch cross-breds in the Scotch markets about $\frac{1}{4}d.$ more. These prices are $\frac{1}{2}d.$ per lb. lower than those of October last year, and $1\frac{1}{4}d.$ to $2d.$ less than those of last February and March.

The Hampshire Down breed has been very well represented at the Metropolitan market by a good number of tegs weighing about 60 lb. dead weight, and about nine months old. These have formed the "first quality" class for Downs during the month, and have realised as a rule from 35s. to 42s. per head. Another class of sheep has been a prominent feature at Islington of late, viz., the Irish Longwools, or Roscommons. In the eyes of British breeders these sheep find no favour, but they sell surprisingly well in comparison with the English Longwools in the same market, the butchers preferring them for their wealth of lean flesh. They have been fetching about $6\frac{3}{4}d.$ per lb., and find plenty of buyers.

Fat Pigs.—There was no improvement in the average value of fat pigs; in fact, the price in about forty British markets was a little less than in September. Prime small pigs averaged 6s. $4\frac{1}{4}d.$ per 14 lb. stone, and larger pigs 5s. 9d.

Carcass Beef—British.—The trade in Scotch beef in the London dead meat market was remarkably steady. Short sides made an average of $7\frac{1}{8}d.$ per lb. for first quality, and whole sides made from $6\frac{1}{4}d.$ to $6\frac{1}{2}d.$, without any variation from week to week. The English beef on offer could never be classed as first quality, and averaged $5\frac{3}{4}d.$ per lb.

Port-killed Beef.—The quality of this beef fell off during the month, and prices declined accordingly. Those quoted averaged $5\frac{1}{2}d.$ and $6d.$ per lb. for the better qualities, but this does not include the "ranchers," which made considerably less.

Chilled Beef.—Only very trifling supplies of States chilled came forward, and prices were scarcely worth quotation. Those from Argentina were heavy, and prices for hindquarters declined by over 1d. per lb. between the first and last weeks. Forequarters were remarkably cheap, and very large quantities were forced off at no more than $1\frac{1}{2}d.$ per lb. The average for hindquarters was 4d. per lb., and $3\frac{1}{2}d.$ for second quality. Some splendid prize quarters from the show at Buenos Ayres were exhibited, and 7d. per lb. was asked for them; but they were too fat for the demand at this season. At Christmas they would have sold well.

Frozen Beef.—In view of the very low price of chilled, "hard" beef was at a discount, and transactions were small. The nominal average price of hindquarters was 3d. to $3\frac{3}{4}d.$ per lb.

Carcass Mutton—Fresh Killed.—The trade at times was even worse than in September, and in the middle of the month, small Scotch mutton, for which there is usually a good demand, was sold at ruinously low prices. In the last week there was a sharp recovery, and prices stood

at $6\frac{1}{2}d.$ to $7d.$ for Scotch, $6d.$ to $6\frac{1}{2}d.$ for English, and $5\frac{1}{2}d.$ to $6\frac{1}{4}d.$ for Dutch.

Frozen Mutton and Lamb.—Frozen mutton was inclined to easier values, and New Zealand best quality was worth $4d.$ to $4\frac{1}{4}d.$ per lb. Lamb was also a little cheaper, the top price being $5\frac{1}{2}d.$ per lb.

Veal.—Demand was limited, and prices seldom exceeded $7\frac{1}{2}d.$ for the best English on offer. Large quantities were sold at $6\frac{1}{2}d.$ per lb.

Pork.—Influenced by the changes of weather, prices fluctuated between $6d.$ and $7d.$ per lb. for prime small English pigs, and $5\frac{1}{2}d.$ was a frequent price for medium sizes.

THE PROVISION TRADE IN OCTOBER.

HEDLEY STEVENS.

Bacon.—Further reductions in the price of bacon of all descriptions have taken place during the month, chiefly owing to the poor consumptive demand for the time of year, also to a certain extent to the larger arrivals from the Continent and Ireland, the latter caused by the accumulation of stock during the Irish railway strike. The killings in Denmark for the month have been heavy. The prices now being realised for the bacon in England are resulting in serious losses to the Danes on account of the high prices demanded for feeding stuffs. In order to clear an accumulation of mildly-cured Russian bacon, as low as $36s.$ per cwt. has been taken for the light averages.

American and Canadian bacon have also experienced a dragging demand here, and prices have favoured buyers. During the month an unusual number of young swine have been marketed in the western states of America, and towards the end of the month the average weight of hogs on the Chicago market was 48 lb. less than a year ago. This marketing of the young stock is attributed to the cholera scare, as well as to the shortage of feed in some districts. From March 1st to October 19th the total Western slaughtering of hogs was $16,110,100$, against $12,305,000$ a year ago, an increase of $3,805,000$, or a gain of 31 per cent. The total slaughtered over the same period two years ago was $14,165,000$. Prices of hogs during the month have ranged from $\$5.70$ to $\$6.80$, against $\$7.80$ to $\$9.35$ last year, and $\$6.95$ to $\$8.20$ two years ago.

English pigs have been cheaper, as breeders continue to force their holdings on the markets on account of the high price of feed. Those who adopt the sound policy of keeping in the breeding business, irrespective of temporary adverse conditions, will reap the benefit later, as higher prices are bound to follow.

Cheese.—The wholesale demand during the month has not been as good as it was in September, this doubtless being due to a reduction in the consumption; also dealers have been very nervous of operating for their winter supplies, on account of the high prices prevailing. Spot prices for Canadians have changed very little, but are from $14s.$ to $16s.$ above those current at the same time last year. The markets in Canada have shown some fluctuation, purchases having been made at the end of the month at several shillings per cwt. reduction, but the deals were in the October make, which, unless the weather

is very favourable, is not worth as much as the September make. However, the weather on the whole this year has been favourable for the October make, especially during the first half of the month. The cabled reports from Canada as to the shortage in the season's make of cheese are very conflicting, but a safe estimate is 140,000 cheese.

The shortage of stored stocks of all descriptions in England is more apparent, as we are practically at the end of the season's make. Only the fact that the arrivals from New Zealand are now near at hand keeps prices at their present level. The first shipment is due in London on November 16th, and regular weekly arrivals will follow, although the quantities on the first steamers will be small. Contracts are still being made for regular deliveries throughout the season (December, 1911 to June 1912) at around 68s. landed terms. Cables from New Zealand report favourable conditions for a large make, and as the prices are very remunerative to the farmers, they will do their best to manufacture a record quantity. Contrary to the usual custom, most of the output has this season been purchased by the English houses, instead of being consigned for sale at market price on arrival.

At the end of the month the stock of Canadian cheese at the three principal distributing centres (London, Liverpool, and Bristol) was 340,000 cheese, against 426,000 at the same time last year, and 378,000 two years ago.

English cheese has been in good demand, and extreme prices have been paid for fancy parcels, as really desirable lots for the winter trade are in small supply. It is estimated that the make of English cheese is 25 per cent. less than last season.

Butter.—Contrary to expectation, prices have fallen during the month, and some descriptions are as much as 1d. per lb. cheaper. The extremely high prices (about 2d. per lb. over those current at the same time last year) have curtailed the consumption, and increased the demand for butter substitutes.

The arrivals from Siberia are now falling off in quantity, as the season is getting near its close. The shipments from Australia from September 1st to the end of October were about 50,000 boxes less than for the same time last year, but cables report the conditions favourable for a large make, and doubtless this shortage will soon be made up. The shipments from New Zealand are also a little less, but a large make may be expected in that country during the coming season. Canada has still been shipping butter to this country, but that source of supply is now nearly exhausted for this year. It is interesting to note that the Canadian arrivals during the past season show a large increase over the previous two years, the shipments from Montreal being as follows:—From May 1st to October 31st, 1911, 133,612 packages, against 27,341 during the same period of 1910, and 38,588 in 1909.

In the United States of America prices are now beyond an export basis, and the stocks in cold store are much less than at the same time last year.

Eggs.—English new-laid have been extremely scarce and dear, which has helped the trade considerably for finest preserved, especially best Irish.

PRICES OF AGRICULTURAL PRODUCE.

AVERAGE PRICES OF LIVE STOCK in ENGLAND and SCOTLAND
in the Month of October, 1911.

(Compiled from Reports received from the Board's Market
Reporters.)

Description.	ENGLAND.		SCOTLAND.	
	First Quality.	Second Quality.	First Quality.	Second Quality.
FAT STOCK:—	per stone.*	per stone.*	per cwt.†	per cwt.†
Cattle:—	s. d.	s. d.	s. d.	s. d.
Polled Scots	8 7	7 8	40 7	36 5
Herefords	8 5	7 9	—	—
Shorthorns	8 3	7 4	39 4	35 6
Devons	8 5	7 6	—	—
	per lb.*	per lb.*	per lb.*	per lb.*
	d.	d.	d.	d.
Veal Calves	8	7	8½	7
Sheep:—				
Downs	7½	6½	—	—
Longwools	7	6	—	—
Cheviots	7½	7	7½	6½
Blackfaced	7½	6½	7	6
Cross-breds	7½	6½	7¾	6½
	per stone.*	per stone.*	per stone.*	per stone.*
	s. d.	s. d.	s. d.	s. d.
Pigs:—				
Bacon Pigs	6 5	5 10	6 2	5 7
Porkers	7 1	6 6	6 8	5 11
LEAN STOCK:—	per head.	per head.	per head.	per head.
Milking Cows:—	£ s.	£ s.	£ s.	£ s.
Shorthorns—In Milk ...	22 5	18 4	22 12	17 19
„ —Calvers... ..	21 5	17 18	18 18	16 17
Other Breeds—In Milk ...	19 2	16 13	19 19	16 4
„ —Calvers	13 15	12 0	19 17	15 18
Calves for Rearing	2 0	1 10	2 6	1 11
Store Cattle:—				
Shorthorns—Yearlings ...	9 5	7 12	10 5	8 11
„ —Two-year-olds ..	13 0	11 7	14 7	12 10
„ —Three-year-olds ...	16 17	14 13	15 14	14 0
Polled Scots—Two-year-olds	—	—	15 14	12 17
Herefords— „	14 15	13 5	—	—
Devons— „	12 7	10 12	—	—
Store Sheep:—				
Hoggs, Hoggets, Tegs, and Lambs—	s. d.	s. d.	s. d.	s. d.
Downs or Longwools ...	27 6	21 11	—	—
Scotch Cross-breds ...	—	—	21 6	20 1
Store Pigs:—				
8 to 10 weeks old	14 11	11 7	15 9	14 4
12 to 16 weeks old	24 3	18 4	28 2	23 1

* Estimated carcass weight.

† Live weight.

AVERAGE PRICES of DEAD MEAT at certain MARKETS in
ENGLAND and SCOTLAND in the Month of October, 1911

(Compiled from Reports received from the Board's Market
Reporters.)

Description.	Quality.	Birming- ham.	Liver- pool.	Lon- don.	Man- chester.	Edin- burgh.	Glas- gow.
		per cwt. s. d.	per cwt. s. d.	per cwt. s. d.	per cwt. s. d.	per cwt. s. d.	per cwt. s. d.
BEEF :—							
English	1st	54 0	50 6	—	48 6	56 0*	57 6*
	2nd	48 6	46 6	54 0	46 0	50 6*	51 6*
Cow and Bull	1st	45 6	43 0	46 6	43 6	46 0	45 6
	2nd	39 6	38 6	41 6	38 0	39 6	41 0
U.S.A. and Cana- dian :—							
Port Killed	1st	53 0	50 6	55 6	—	—	52 6
	2nd	47 6	47 0	51 0	46 6	—	50 0
Argentine Frozen—							
Hind Quarters...	1st	32 6	32 0	32 0	32 0	34 0	33 6
Fore „ ...	1st	22 6	21 6	23 0	21 6	21 6	23 6
Argentine Chilled—							
Hind Quarters...	1st	38 6	38 0	37 6	38 0	38 0	39 6
Fore „ ...	1st	23 6	23 6	21 6	23 6	22 6	23 6
Australian Frozen—							
Hind Quarters...	1st	32 6	30 6	32 0	30 6	—	32 6
Fore „ ...	1st	23 0	21 0	23 0	20 6	—	22 6
VEAL :—							
British	1st	60 6	69 6	69 6	69 6	—	70 0
	2nd	52 6	64 0	60 6	64 6	—	—
Foreign	1st	—	—	71 0	—	71 6	—
MUTTON :—							
Scotch	1st	—	64 0	63 0	64 0	60 6	65 6
	2nd	—	59 6	58 6	62 0	53 6	45 0
English	1st	57 6	59 0	58 6	60 6	—	—
	2nd	—	54 0	53 6	56 0	—	—
Argentine Frozen ...	1st	33 6	33 0	32 6	33 0	33 6	33 0
Australian „ ...	1st	32 0	30 6	30 6	30 6	—	31 6
New Zealand „ ...	1st	—	—	37 6	—	—	—
LAMB :—							
British	1st	—	—	—	—	—	65 6
	2nd	56 0	—	—	—	—	45 6
New Zealand	1st	52 0	50 0	50 6	50 6	—	49 0
Australian	1st	45 0	41 0	43 6	41 0	—	39 6
Argentine	1st	43 6	42 6	46 6	42 6	—	39 6
PORK :—							
British	1st	65 6	67 0	60 6	65 6	55 6	55 6
	2nd	58 6	62 6	55 6	60 6	48 0	52 0
Foreign	1st	—	—	55 0	—	—	—

* Scotch.

AVERAGE PRICES of **British Corn** per Quarter of 8 Imperial Bushels, computed from the Returns received under the Corn Returns Act, 1882, in each Week in 1909, 1910 and 1911.

Weeks ended (<i>in</i> 1911).	WHEAT.						BARLEY.						OATS.					
	1909.		1910.		1911.		1909.		1910.		1911.		1909.		1910.		1911.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Jan. 7 ...	32	9	33	6	30	5	26	11	24	11	23	11	17	5	17	2	17	0
" 14 ...	32	8	33	8	30	8	27	1	24	11	23	10	17	5	17	7	17	2
" 21 ...	33	2	33	9	30	11	27	3	24	11	24	4	17	8	17	6	17	4
" 28 ...	33	0	33	6	30	11	27	6	25	0	24	5	17	9	17	4	17	3
Feb. 4 ...	33	4	33	7	30	9	27	7	24	10	24	5	17	10	17	7	17	5
" 11 ...	33	8	33	4	30	5	27	8	24	9	24	6	17	11	17	11	17	5
" 18 ...	34	1	33	0	30	3	27	11	24	6	24	7	18	0	18	0	17	6
" 25 ...	34	5	32	7	30	2	28	0	24	2	24	9	18	0	17	10	17	7
Mar. 4 ...	34	10	32	7	30	0	27	11	24	6	25	0	18	2	18	1	17	5
" 11 ...	35	8	32	6	30	1	28	4	24	1	25	0	18	2	18	0	17	5
" 18 ...	35	9	32	6	30	1	28	0	23	6	24	11	18	5	18	0	17	6
" 25 ...	36	0	32	9	30	2	28	0	23	7	25	0	18	6	17	11	17	5
Apl. 1 ...	36	5	33	0	30	3	27	10	23	8	24	11	18	8	18	0	17	5
" 8 ...	37	4	33	6	30	4	28	0	23	1	24	7	18	10	17	11	17	7
" 15 ...	38	7	33	7	30	3	27	8	23	5	25	2	19	2	18	3	18	3
" 22 ...	41	4	33	7	30	4	28	2	23	0	25	5	19	9	18	3	17	10
" 29 ...	42	5	33	0	30	11	27	10	22	10	25	5	20	0	18	3	18	3
May 6 ...	40	9	32	6	31	4	27	7	22	7	25	7	20	3	18	2	18	6
" 13 ...	41	6	32	1	31	8	27	3	22	0	25	1	20	6	18	1	19	0
" 20 ...	42	8	31	10	32	6	27	0	21	8	25	4	20	11	17	8	19	2
" 27 ...	42	6	31	3	32	8	26	3	21	4	25	0	21	0	17	10	19	5
June 3 ...	43	1	30	2	32	5	25	7	21	8	24	10	21	3	17	10	19	5
" 10 ...	42	11	29	1	32	4	26	10	20	9	25	7	21	4	17	10	19	7
" 17 ...	42	7	29	0	32	3	26	10	18	11	23	11	21	6	18	0	19	8
" 24 ...	42	8	29	4	31	11	27	2	20	1	23	9	21	7	17	9	19	10
July 1 ...	42	9	29	9	31	10	27	2	19	11	24	5	21	9	17	7	19	9
" 8 ...	43	0	30	4	32	1	26	4	19	5	25	10	21	8	17	4	19	9
" 15 ...	43	3	31	1	32	3	26	10	21	3	25	10	21	9	17	7	19	11
" 22 ...	44	0	31	11	32	5	27	4	19	9	24	3	22	5	17	5	19	5
" 29 ...	43	5	33	5	32	5	24	6	20	10	23	8	22	2	18	1	19	7
Aug. 5 ...	44	9	33	9	32	0	27	4	20	5	24	4	22	11	18	3	18	2
" 12 ...	44	9	33	5	31	6	24	9	20	4	26	9	21	8	18	0	18	0
" 19 ...	41	6	32	11	31	6	23	11	20	11	27	8	19	8	17	11	17	10
" 26 ...	38	5	32	7	31	8	24	7	20	10	28	10	19	4	17	2	18	0
Sept. 2 ...	37	2	32	2	31	7	26	3	22	10	28	4	19	6	17	2	18	3
" 9 ...	34	11	31	11	31	10	26	1	23	3	28	4	18	5	17	2	18	1
" 16 ...	33	6	30	11	32	0	26	5	24	3	29	0	17	9	16	6	18	5
" 23 ...	32	9	30	2	32	4	26	8	24	2	29	11	17	7	16	3	18	9
" 30 ...	32	2	30	1	32	6	26	9	24	4	30	5	17	2	16	4	19	1
Oct. 7 ...	31	8	30	1	32	7	26	9	24	7	30	9	17	0	16	3	19	5
" 14 ...	31	4	30	2	32	9	27	0	25	1	31	0	17	0	16	2	19	10
" 21 ...	31	8	30	4	32	9	27	7	25	3	31	5	16	11	16	1	19	11
" 28 ...	31	10	30	4	33	1	27	9	25	4	31	7	17	0	16	2	20	6
Nov. 4 ...	32	5	30	4	33	4	27	9	25	6	31	10	17	0	16	2	20	8
" 11 ...	32	5	29	11			27	7	25	4			17	1	15	11		
" 18 ...	32	7	29	8			27	0	25	1			17	4	16	1		
" 25 ...	33	0	29	11			26	8	24	10			17	3	16	4		
Dec. 2 ...	33	3	30	6			26	1	24	7			17	4	16	7		
" 9 ...	33	3	30	9			25	7	24	3			17	3	16	9		
" 16 ...	33	2	30	7			25	3	23	9			17	4	16	10		
" 23 ...	33	1	30	7			25	2	23	10			17	4	16	9		
" 30 ...	33	3	30	5			25	1	23	9			17	4	16	9		

NOTE.—Returns of purchases by weight or weighed measure are converted to Imperial Bushels at the following rates: Wheat, 60 lb.; Barley, 50 lb.; Oats, 9 lb. per Imperial Bushel.

AVERAGE PRICES of Wheat, Barley, and Oats per Imperial Quarter in FRANCE, BELGIUM, and GERMANY, and at PARIS, BERLIN, and Breslau.

		WHEAT.		BARLEY.		OATS.	
		1910.	1911.	1910.	1911.	1910.	1911.
		<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
France :	September	46 1	42 8	25 5	26 11	21 1	21 8
	October	46 4	43 0	25 7	27 7	21 0	21 11
Paris :	September	48 10	43 6	24 8	27 0	21 8	22 10
	October	48 10	43 7	25 5	26 10	21 6	22 8
Belgium :	August	34 6	33 8	22 1	25 4	20 0	20 10
	September	33 5	34 2	21 10	26 7	19 9	22 3
Germany :	August	41 7	42 4	24 5	30 6	20 3	23 1
	September	41 0	43 4	25 4	33 4	20 2	24 4
Berlin :	August	42 6	43 6	—	—	21 3	23 7
	September	43 6	44 2	—	—	20 9	25 4
Breslau :	August	38 4	39 7 {	— * 22 11†	29 10* 24 9†	} 20 3	22 11
	September	38 3	40 10 {	25 10* 22 11†	30 8* 24 9†		

* Brewing.

† Other.

NOTE.—The prices of grain in France have been compiled from the official weekly averages published in the *Journal d'Agriculture Pratique*; the Belgian quotations are the official monthly averages published in the *Moniteur Belge*; the German quotations are taken from the *Deutscher Reichsanzeiger*, the prices for the German Empire representing the average of the prices at a number of markets.

AVERAGE PRICES of British Wheat, Barley, and Oats at certain Markets during the Month of October, 1910 and 1911.

			WHEAT.		BARLEY.		OATS.	
			1910.	1911.	1910.	1911.	1910.	1911.
			<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
London...	...	...	32 0	33 9	25 7	32 6	16 11	21 4
Norwich	...	...	30 4	32 9	24 6	31 3	16 1	19 11
Peterborough	...	...	29 4	32 5	26 1	31 3	15 5	20 6
Lincoln...	...	...	29 10	32 5	25 2	31 10	16 6	20 10
Doncaster	...	...	29 3	32 9	23 9	30 9	16 2	19 11
Salisbury	...	...	29 11	31 10	23 9	29 7	16 9	19 6

AVERAGE PRICES of PROVISIONS, POTATOES, and HAY at certain MARKETS in ENGLAND and SCOTLAND in the Month of October, 1911.

(Compiled from Reports received from the Board's Market Reporters.)

Description.	Bristol.		Liverpool.		London.		Glasgow.	
	First Quality.	Second Quality.	First Quality.	Second Quality.	First Quality.	Second Quality.	First Quality.	Second Quality.
BUTTER:—	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Irish ...	per 12 lb. 16 0	per 12 lb. 15 0	per 12 lb. —	per 12 lb. —	per 12 lb. 16 6	per 12 lb. 15 0	per 12 lb. 16 0	per 12 lb. —
Irish Creamery	per cwt. 129 6	per cwt. 125 6	per cwt. 128 6	per cwt. 126 0	per cwt. 132 0	per cwt. 129 0	per cwt. 130 0	per cwt. 128 0
Factory	117 6	114 6	115 6	110 0	120 6	116 0	—	—
Dish ...	—	—	144 0	141 6	144 6	142 0	140 0	137 6
Rich ...	—	—	—	—	137 6	132 0	—	—
Roman ...	126 6	119 0	123 0	119 0	125 0	122 0	123 0	120 0
Canadian ...	130 0	126 0	127 0	125 0	130 0	127 6	129 6	—
Australian ...	—	—	—	—	133 6	129 6	—	—
CHEESE:—								
Irish—								
Cheddar ...	81 6	77 0	84 6	81 0	91 0	84 0	75 6	72 6
Cheshire ...	—	—	120 lb. 87 0	120 lb. 78 6	120 lb. 94 6	120 lb. 83 0	120 lb. 92 0	120 lb. 88 0
Canadian ...	70 0	68 6	per cwt. 70 0	per cwt. 68 0	per cwt. 70 6	per cwt. 69 0	per cwt. 70 0	per cwt. 68 6
BACON:—								
Irish ...	69 6	64 6	65 0	60 0	67 6	64 0	66 0	64 6
Canadian ...	59 6	57 6	58 0	55 0	59 6	56 6	57 0	55 0
HAMS:—								
Cumberland ...	—	—	—	—	110 0	101 6	—	—
Irish ...	—	—	—	—	108 6	104 6	99 0	98 6
American (long cut)	60 0	57 6	59 6	56 0	65 0	61 0	58 0	55 6
EGGS:—								
British ...	per 120. 15 10	per 120. 14 4	per 120. —	per 120. —	per 120. 16 10	per 120. 15 2	per 120. —	per 120. —
Irish ...	12 9	11 9	12 6	11 2	13 6	11 6	12 10	11 4
Darh ...	—	12 0	12 8	11 11	13 4	11 6	12 11	12 5
POTATOES:—								
British Queen	per ton. 91 0	per ton. 83 6	per ton. —	per ton. —	per ton. 90 0	per ton. 81 0	per ton. —	per ton. —
Edw. VII.	95 0	83 6	63 6	58 6	88 6	81 0	—	—
Up-Date ...	84 0	75 0	55 0	51 6	86 0	79 0	60 0	55 0
HAY:—								
Close ...	110 0	100 0	112 6	86 0	122 0	100 0	84 6	79 6
Meadow ...	105 0	95 0	—	—	116 6	94 6	—	—

DISEASES OF ANIMALS ACTS, 1894 to 1910.

NUMBER OF OUTBREAKS, and of ANIMALS Attacked or Slaughtered.

GREAT BRITAIN.

(From the Returns of the Board of Agriculture and Fisheries.)

DISEASE.	OCTOBER.		TEN MONTHS ENDED OCTOBER.	
	1911.	1910.	1911.	1910.
Swine-Fever :—				
Outbreaks	160	124	2,081	1,214
Swine Slaughtered as diseased or exposed to infection ...	2,468	1,323	24,815	11,187
Anthrax :—				
Outbreaks*	75	125	723	1,206
Animals attacked	85	143	892	1,432
Foot-and-Mouth Disease :—				
Outbreaks	9	—	18	2
Animals attacked	26	—	467	15
Glanders (including Farcy) :—				
Outbreaks	25	29	177	317
Animals attacked	52	62	419	923
Sheep-Scab :—				
Outbreaks	5	11	316	361

* For 1910 the figures show the outbreaks reported, but for 1911 the outbreaks confirmed.

IRELAND.

(From the Returns of the Department of Agriculture and Technical Instruction for Ireland.)

DISEASE.	OCTOBER.		TEN MONTHS ENDED OCTOBER.	
	1911.	1910.	1911.	1910.
Swine-Fever :—				
Outbreaks	9	5	113	78
Swine Slaughtered as diseased or exposed to infection ...	158	70	1,923	1,778
Anthrax :—				
Outbreaks	—	2	7	7
Animals attacked	—	2	14	10
Glanders (including Farcy) :—				
Outbreaks	—	—	2	1
Animals attacked	—	—	3	2
Sheep-Scab :—				
Outbreaks	16	18	281	382

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ADDITIONS TO THE LIBRARY.

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Dudgeon, Gerald C.—The Agricultural and Forest Products of British West Africa. [Imperial Institute Handbooks.] (170 pp.) London: John Murray, 1911. 5s. net. [A. 72; L. 10.]

Darbishire, A. D.—Breeding and the Mendelian Discovery. (282 pp.) London: Cassell & Co., 1911. 7s. 6d. net. [B. 17.]

Memoirs of the Geological Survey, Scotland.—The Geology of the Glasgow

- District. (270 pp. + map.) London: E. Stanford, 1911. 4s. 6d. [B. 36.]
- U.S. Dept. of Agriculture.—Farmers' Bull. No. 464:—The Eradication of Quack-Grass. (11 pp.) Washington, 1911. [B. 20-9.]
- The Yorkshire Council for Agricultural Education and the University of Leeds.—Bull. No. 80:—Guide to Experiments at the Manor Farm, Garforth, 1911. (40 pp.) 1911. [B. 46.]
- India, Agricultural Research Institute, Pusa.—Bull. No. 24: The Indian Saltpetre Industry. (19 pp.+8 plates.) Calcutta: Superintendent Government Printing, 1911. 9d. [B. 32.]
- U.S. Dept. of Agriculture, Bureau of Soils.—Bull. No. 80:—Examination of Soils for Organic Constituents, especially Dihydroxystearic Acid. (33 pp. + 2 plates.) Washington, 1911. [B. 40-9.]
- Italy, Ministero di Agricoltura, Industria e Commercio.—Notizie sull' Insegnamento Agrario, Industriale e Commerciale in Italia. (279 pp.) Rome, 1911. Lire 1.50. [B. 44-15.] [This volume was prepared for the purposes of the International Exhibition at Turin, 1911.]
- Ohio Agricultural Experiment Station.—Circ. No. 114:—Plans and Summary Tables of the Experiments at the Central Farm, Wooster, on the Maintenance of Soil Fertility. (21 pp.) Wooster, Ohio, 1911. [B. 24-1.]
- Deutsche Landwirtschafts-Gesellschaft.—Arbeiten. Heft 193:—Versuche über die Wirkung des Kainits, 40%igen Kalisalzes und Phonoliths aus den Jahren 1904-1910. (173 pp.) [B. 32.] Heft 195:—Betriebsverhältnisse der deutschen Landwirtschaft. Stück XV. (114 pp.) [A. 28.] Berlin: Paul Parey, 1911.
- Bevis, J. F., and Jeffery, H. J.—British Plants: Their Biology and Ecology. (334 pp.) London: Alston Rivers, 1911. 4s. 6d. net. [B. 16-3.]
- The A.B.C. System for keeping the Accounts of a Farm. [Second edition.] Leicester: J. McQueen & Co., n.d. 13s. 6d. [B. 50.]

Field Crops—

- Rutter, W. P.—Wheat-Growing in Canada, the United States, and the Argentine. (315 pp.) London: A. & C. Black, 1911. 3s. 6d. net. [C. 2.]
- Sutton, Martin J.—Permanent and Temporary Pastures. [Eighth edition.] (198 pp.) London: Simpkin, Marshall, 1911. 5s. [C. 42-1.]
- Bedfordshire County Council, Agricultural Education Committee.—Report on the Wheat and Oat Plots, 1911. (4 pp.) 1911. [C. 2-1; C. 16.]
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Plant Diseases—

- Deutsche Landwirtschafts-Gesellschaft.*—Arbeiten. Heft 190:—Die Blattrollkrankheit und unsere Kartoffelernten. (102 pp.) Berlin: Paul Parey, 1911. [E. 60-37.]
- Lundbeck, W.—Diptera Danica. Genera and Species of Flies hitherto found in Denmark. Part III., Empididæ. (324+5 pp.) London: W. Wesley and Son, 1910. [E. 6; E. 40-1.]
- Texas Agricultural Experiment Station.*—Press Bulletins:—Treatment for the San Jose Scale. (5 pp.) [E. 40-39.] The Control of Weevils in Corn and Grain. (5 pp.) [E. 40-11.] Brazos County, Texas, 1911.
- Maine Agricultural Experiment Station.*—Bull. No. 177:—Insect Notes for 1909. (21-44 pp.) [E. 8.] Bull. No. 178:—A New Species of Endomyces from Decaying Apple. (45-64 pp. + 10 plates.) [E. 60-11.] Bull. No. 180:—Fungus Gnats (*Mycetophilidæ*) of North America. Part II., The *Sciophilinae*. (125-192 pp. + 4 plates.) [E. 40-3.] Bull. No. 181:—Gall Aphids of the Elm. (193-240 pp. + 12 plates.) [E. 40-7.] Bull. No. 182:—Four Rare Aphid Genera from Maine. (241-248 pp. + 6 plates.) [E. 40-45.] Bull. No. 185:—Maine Apple Diseases. (337-392 pp. + 16 plates.) [E. 60-11.] Orono, Maine, 1911.
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Live Stock—

- Rhodesia, Dept. of Agriculture.*—Leaflet No. 1:—The Breeds and Breeding of Swine. (7 pp.) [F. 82.] Leaflet No. 3:—Swine Husbandry in Rhodesia. (7 pp.) [F. 82.] Salisbury, Rhodesia, 1911.
- New South Wales, Dept. of Agriculture.*—Farmers' Bull. No. 45:—Harness, Harness Fitting and Repairing. (30 pp.) [F. 64-1.] Farmers' Bull. No. 46:—Blacksmithing for Farmers, with Notes on Horse-shoeing. (45 pp.) [F. 64-7; M. 4.] Sydney, 1911.
- U.S. Dept. of Agriculture, Bureau of Animal Industry.*—Bull. No. 139:—The Nutritive Value of the Nonprotein of Feeding Stuffs. (49 pp.) Washington, 1911. [F. 74-1.]

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VERIT tells—such is the simple explanation of the above. This fact was fully borne out on the occasion of a recent visit the writer had the pleasure and privilege of making at the splendidly equipped and comparatively recently erected factory of the Molassine Co., Ltd., at Tunnel Avenue, East Greenwich. He saw the imposing suite of offices, replete with every convenience, and their own telephone exchange for securing rapid interchange of communication between every department, strikes one as being the home of a very and well-organised business. The busy heads of departments, with each their respective staff of clerks, show thorough efficiency, and a single item will convey an idea of the magnitude of this progressive Company's operations—one month's railway bill amounting to no less than £300. The erection of the building cost £50,000, and doubtless expansion will follow to meet ever-growing needs. There are four vast storage tanks, the capacity of one being over 4,000 tons, and the addition of a further tank is under consideration.

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"Those receiving no Meal 10·0 per cent."

"July 17th, gave four other cows 4 lb. Meal per day each."

N.B.—These were taken from among the ten cows named above.

"The total increase for the four cows was 10 pints daily."

N.B.—By this date the pastures were "burnt dry."

"The cream from these four cows registered 11·75 per cent."

"The cream from the cows receiving no Meal registered 10·0 per cent."

"Four other cows similar in every respect were put upon 2 lb. Soya Bean Cake and 2 lb. Cotton Cake."

The total increase of milk from these four cows averaged $10\frac{1}{2}$ pints daily, but the cream registered 11'50 per cent.

"July 24th.—On this date the cream tester showed results as follows:—From milk from cows receiving *no* cake or Greenwich Dairy Meal, 10'25 per cent. From those receiving Soya Bean and Cotton Cake 11'75 per cent. From those receiving Greenwich Dairy Meal 12'00 per cent."

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A new department for Bird Seed is one of the latest enterprises of the Molassine Co., Ltd., and more will be heard of this in the near future.

For chatty news of interest to all concerned in agriculture and live stock a perusal of *The Molassine World*, issued monthly by the Company, will repay perusal, this popu-

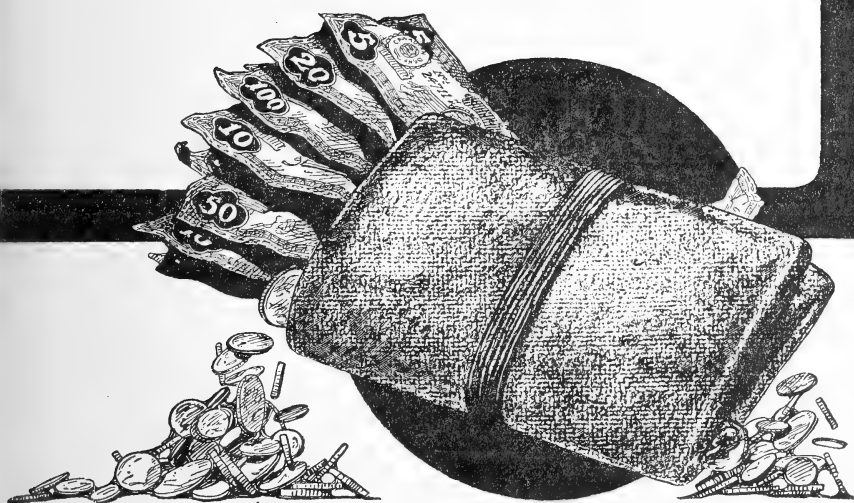
lar publication having already a circulation of 25,000 copies per month.

Having described the various plants of the Molassine Company, a few words of facilities they possess for producing on a large scale are appropriate, and the vast works amply demonstrate their own electric plant supplies power throughout the vast range of buildings, both offices and works, and a well installed on the premises supplies water. Raw material is brought on board by means of a travelling crane direct into the works, and after the necessary treatment, passes into the various machines, to be duly reduced to the state for making into cakes, which are cut automatically, stamped, and passed by further machinery into the baking ovens, the whole of these processes being mechanically carried out untouched by hands, thus ensuring the very acme of cleanliness in preparation, after which the finished product is packed in sacks printed by the machine.

A further department worthy of mention is the well-appointed laboratory where continual tests are being made to ensure the high standard aimed at by the Molassine Co. in the production of all manufactures being fully maintained, where new experiments for the furtherance of this ideal are carried out and the samples subjected to analysis.

Reverting to the offices of the Company it is of interest to note the care paid to the comfort of the staff in the up-to-date kitchen department and dining-room which feed an average of about thirty persons per day. This must indeed be a boon to their employees, in a district where no class outside accommodation is to be obtained. This brings to a close these fine works, covering about 100 acres of land, and there is not the slightest doubt that the Molassine Co., Ltd., carries on such excellent lines, must continue to expand and grow in the future, as they have in the past. A final word to those who "Proof" is to send for one of the booklets entitled such.

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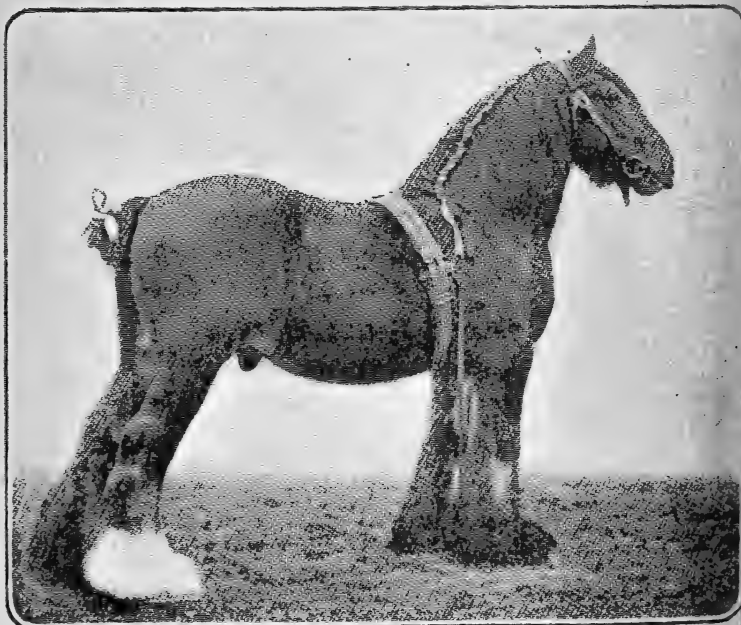
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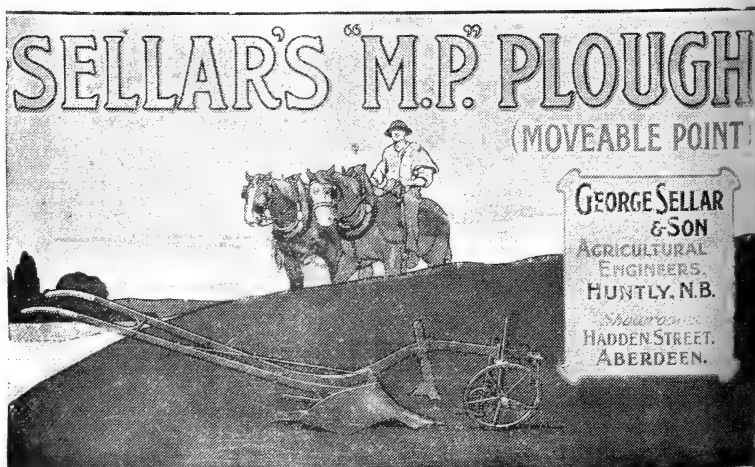
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